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SCIENCE AND TECHNOLOGY POLICY

No. 17

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CONTENTS

PROGRAM FOR DEVELOPMENT OF INDUSTRIAL ROBOTS DISCUSSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 83 p 2

/Survey prepared by the Division of Mechanization and Automation of Production and Ergonomics of the USSR State Committee for Science and Technology: "Automatic Manipulators"/

/Text/ The importance and urgency of development of the production and widespread use of automatic manipulators with program control (industrial robots) and of built-in automatic control systems with the use of microprocessors and microcomputers and of the establishment of automated shops and plants are stressed by the 26th CPSU Congress.

Productivity growth simultaneously with the facilitation of labor is one of the most important conditions for the transition to a primarily intensive path of development carried out by our economy. Overall mechanization and automation of production, in whose basis the share of automatic manipulators (industrial robots) becomes increasingly weighty, play the leading role in this matter. In contrast to ordinary mechanized and automated devices used in flow lines, mainly during mass output, industrial robots are capable of rapidly resetting themselves and of servicing production facilities with a changing nature of industrial processes.

The scientific and technical program "To Develop and Master Automatic Manipulators in 1981-1990" being realized will make it possible in large measure to exclude the use of manual unskilled and monotonous labor, as well as of labor under difficult conditions harmful for human health, and to organize overall automated production facilities.

The program envisages the development and mastering in 1981-1985 of about 50 models of new industrial robots, 38 industrial complexes of the "machine-automatic manipulator" type, 17 automated shops and sections equipped with automatic manipulators and standardized accessories of 49 types for automatic manipulators, including program control units, complete electric drives, hydropneumatic equipment and external and internal information sensors. At the same time, 60 scientific research studies are performed and a number of guiding technical materials for the standardization, unification, operation and evaluation of the technical level and for the determination of the economic efficiency of automatic manipulators are prepared. The principles of modular unit designing and adaptive control based on a widespread utilization of accessories and modern microprocessors are taken as the basis.

In Heaviest Work

Machine building is the major object of introduction of industrial robots. Automatic manipulators with program control for the servicing of metal cutting, forging-pressing and casting equipment and for the performance of welding, assembly and painting operations are involved. Technological complexes of the "machine-automatic manipulator" type for machining, cold and hot forging, pressure die casting and assembly and painting of parts are being developed.

A total of 27 automatic manipulators are engaged in spot welding, assembly and other operations at the Motor Vehicle Plant imeni Likhachev. In all, more than 200 industrial robots and balanced (for moving loads) manipulators will be introduced at the enterprise during the 5-year period.

About 20 fundamentally new automated machines and sets of equipment fitted with industrial robots for the performance of stoping, sinking, repair, loading-unloading, transport lifting and other industrial operations in underground coal mining are to be developed and mastered in the coal industry by the end of 1990. On their basis two overally mechanized mines will be introduced at the Donetsk and Kuznetsk coal basins, at which coal extraction will not require the constant presence of workers in stoping faces.

On the whole, the program for the development of automatic manipulators (industrial robots) consists of 190 assignments. In addition to machine building and the coal industry they encompass ferrous and nonferrous metallurgy, agriculture, construction, light and food industry and transport.

Leading USSR ministries were entrusted with the responsibility for the development, production and introduction of automatic manipulators with program control, as well as their provision with accessories and spare parts.

The Central Scientific Research and Experimental Design Institute of Robotics and Engineering Cybernetics at the Leningrad Polytechnical Institute imeni M. I. Kalinin was appointed the head organization for the development of automatic manipulators for the entire national economy.

The fulfillment of the assignments established for the 11th Five-Year Plan will make it possible to increase the pool of automatic manipulators sixfold as compared with 1976-1980. As a result of their introduction more than 70,000 people will be relieved of heavy manual work and monotonous operations by the end of 1985. Furthermore, plans have been made for the commissioning of capacities for the output of automatic manipulators with program control and accessories for them and the establishment of more than 75 model-demonstration automated shops and sections for various types of production facilities.

The scale of this work will expand significantly during the 12th Five-Year Plan. Economic efficiency will also rise.

Introduction Incentives

In 2 years of the current five-year plan the Ministry of Machine Tool and Tool Building Industry, the Ministry of Automotive Industry, the Ministry of Chemical and Petroleum Machine Building and a number of other sectors have manufactured prototypes and turned out adjusting series of industrial robots for

the servicing of metal cutting lathes, machine tools, presses and machines for pressure die casting and for spot welding and painting, as well as units for contour program control of automatic manipulators for arc welding processes and the application of paint and varnish coatings.

Automated sections for the machining and sheet metal and hot stamping of parts have been put into operation at the plants of the Ministry of Heavy and Transport Machine Building and of the Ministry of Automotive Industry. A total of 26 models of new automatic manipulators, 9 sets of equipment fitted with them and 18 types of accessories have been developed and mastered in production.

Extensive work in this direction is carried out at many enterprises in the country, especially in Moscow and Leningrad and in Moscow, Leningrad, Nikolayev, Chelyabinsk, Gorkiy, Vladimir, Novosibirsk and Tomsk oblasts.

An automated shop for the manufacture of shafts has been established at the Kama Association for the Production of Heavy Freight Motor Vehicles. The use of manipulators for the automation of auxiliary operations in the loading of processing equipment disengaged about 100 workers there. A technological complex for the production of thermoregulators for household refrigerators equipped with automatic manipulators was put into operation at the Orel Prompribor Production Association. Labor productivity rose more than sixfold and 120 workers were disengaged.

Scientific and methodological councils for the generalization and popularization of advanced experience in the development and introduction of automatic manipulators and sets of industrial equipment, sections and shops automated on their basis now operate on a voluntary basis in most of the country's economic regions. As a rule, such councils were established at oblast and city party committees. The Robototekhnika Scientific Training Center of the USSR Academy of Sciences and of the USSR Ministry of Higher and Secondary Specialized Education was formed in 1982.

The training of engineering personnel in the specialty "robot engineering systems" has begun in a number of higher educational institutions. For example, the training of specialists in the new direction "mechanics of machine control. Robots and manipulators" was organized at the Moscow Order of Lenin and Order of the Red Banner of Labor Higher Technical School imeni N. E. Bauman.

In 1982 the decree of the USSR State Committee for Labor and the AUCCTU introduced a new occupation "setter up of machine tools and manipulators with program control" into "Yedinyy Tarifnyy Klassifikatsionnyy Spravochnik" /Unified Job and Wage Rates Classification Manual/. The training of skilled workers in the setting up and servicing of machine tools and automatic manipulators with program control has begun in the secondary vocational and technical schools of the State Committee for Vocational and Technical Education.

In 1982 the USSR State Committee for Science and Technology, the USSR State Planning Committee and the USSR State Committee for Labor and Social Problems developed and approved the "Procedure of Deduction at the Disposal of Associations and Enterprises of Part of the Funds Additionally Obtained as a Result of the Use of Manipulators in Production and Their Use." It determined a 25

percent increase in the amount of incentives for the use of automatic manipulators with program control, which greatly lower the labor intensiveness of production, primarily in operations with heavy and harmful working conditions, from the capital of the centralized bonus fund for the development, mastering and introduction of new equipment.

The USSR State Planning Committee and the USSR State Committee for Material and Technical Supply with the participation of the USSR State Committee for Science and Technology, the USSR State Committee for Prices and the USSR Ministry of Finance established the "Procedure for the Planning of the Production and Delivery of Automatic Manipulators With Program Control (Industrial Robots)." All-Union State Standards for program control units, for series of load capacity, for terms and definitions and for the classification and list of basic indicators of industrial robots were approved. An instruction for the evaluation of the economic efficiency of the development and use of this equipment was prepared.

USSR cooperation between the USSR and CEMA member countries in the field of development and mastering of the production of new types of automatic manipulators with program control and accessories is becoming more and more fruitful. It is carried out both within the framework of the general agreement on multilateral cooperation in the development and organization of specialized and cooperated production of industrial robots and within the framework of bilateral intergovernment agreements.

Problems Requiring Solution

At present the efforts of head scientific research and planning and design organizations are concentrated on the development of flexible (resetable) automated production facilities on the basis of machines and equipment with program control, automatic manipulators and microprocessor equipment. This is extremely important for ensuring overall automation of industrial processes, especially under conditions of a rapidly changing multilist output of articles.

In turn flexible automated production facilities require a fundamental change in the existing structure and organization in production control and improvement in industrial processes and equipment. At the same time, there is a need to additionally staff enterprises with highly skilled production cadres possessing theoretical and practical knowledge in the field of production automation.

Many problems requiring an immediate solution arise in the development, mastering and introduction of flexible automated production facilities on the basis of manipulators with program control. Not all head ministries properly guide and coordinate work on the development of automatic manipulators according to the specialization and list assigned to them. Their head technological organizations and enterprises also poorly operate in this direction. As a consequence, duplication and parallelism occur in individual models of industrial robots.

The production of automatic manipulators for the mechanization and automation of such labor intensive and heavy operations as the assembly, chipping and fettling of castings and hot forging in the Ministry of Machine Tool and Tool

Building Industry (deputy minister N. Panichev), contact welding in the Ministry of Automotive Industry (deputy minister Ye. Bashindzhagyan) and painting in the Ministry of Chemical and Petroleum Machine Building (deputy minister G. Shein) is developed and mastered at insufficient rates. The Ministry of Instrument Making, Automation Equipment and Control Systems (deputy minister G. Kavalerov) lags in the mastering of external and internal information sensors for the equipping of automatic manipulators.

The Ministry of Electrical Equipment Industry (deputy minister Yu. Nikitin) has not solved the problem of development of capacities for the production of complete electric drives for automatic manipulators with program control. This entails serious complications with the rise in the technical level of industrial robots.

The Central Scientific Research and Experimental Design Institute of Robotics and Engineering Cybernetics (director Ye. Yurevich) does not properly ensure the fulfillment of the functions of a head organization in the part of the development of automatic manipulators for the entire national economy, primarily for nonmachine building sectors of industry.

The institutes of the USSR Academy of Sciences participating in the performance of scientific research and in the development of software for control units and program control systems for automatic manipulators must also improve the contact with sectorial organizations and enterprises.

In the process of development and, especially, operation of industrial robots it was possible to more fully disclose their technical essence. Generalization of the accumulated experience indicates that a unit application of automatic manipulators and their adaptation to obsolete traditional types of industrial equipment lowers the effect. The advisability of their introduction can be determined only as a result of a study of the automation equipment used at an enterprise and careful technical and economic calculations.

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CSO: 1814/147

POLITICAL AND LEGAL ASPECTS OF REGIONAL SCIENTIFIC-TECHNICAL POLICY

Moscow SOVETSKOYE GOSUDARSTVO I PRAVO in Russian No 4, Apr 83 pp 28-36

/Article by V. L. Kvint, senior scientific associate of the Institute of Economics of the USSR Academy of Sciences, candidate of economic sciences: "The Political Scientific and Legal Aspects of Regional Scientific and Technical Policy"/

/Text/ Intensification of production and effective utilization of the achievements of scientific and technical progress can serve as a basis for the implementation of the broad social program for satisfying the growing needs of the Soviet people and a basis for the rapid development of the country's national economy. Under conditions whereby the main increase in the raw material, fuel, and energy resources is provided through their assimilation in the eastern regions of the country, the role of scientific and technical progress becomes especially great. The implementation of such large-scale regional programs of unionwide significance as the economic development of the zone of the Baykal-Amur railroad mainline, the assimilation of the natural resources of the Northern Krasnoyarsk territorial production complex and the Kansk-Achinsk fuel and energy complex, and the development of the petroleum and gas regions of Western Siberia lead to a qualitatively new phenomenon--the influence of scientific and technical progress on the natural and technogenic environment of immense regions. This process can also take place in regions of intensive revamping of industry and agriculture. Here it is sufficient to bring up the example of the Nonchernozem zone of the RSFSR.

During the years of the 10th Five-Year Plan not only regional economic, but also regional scientific research programs were developed in the country, particularly the program of research on comprehensive utilization of natural resources in Siberia and its socio-economic development--the Sibir' super-program, and a program of research of the middle region which was directed toward studying the possibilities and consequences of diverting part of the water from Siberian and Northern rivers into Kazakhstan and Central Asia. A manifestation of this new phenomenon, the influence of scientific and technical progress on large regions, has been noted in the development of the economies of many foreign countries as well: in Bulgaria (the program for the development of the Sillistrenskiy district), the United States (the program for the assimilation of the resources of the Tennessee River Valley and the program for laying the Transalaska Pipeline), in Canada (the program for new economic assimilation of the northern territories of the province of Quebec--

the region of James Bay), in Japan (the program for the development of Hokkaido) and so forth.

The stronger interstate economic and scientific-technical ties and the deeper international division of labor also lead to the appearance of multinational regional programs for scientific and technical progress, to the formation of geopolitical regions, and to the existence of various regional breakdowns of the world economy. For example, there is general recognition of the separation of such regions as: arid Africa, tropical Africa, northern Europe; scientific and technical regionalization of the world ocean (in terms of the rules of using fishing equipment and kinds of it); and other integrated regional groupings. On the one hand, regionalization of scientific and technical progress requires the formation of a consistent strategy for revealing the methods and means of effective development and realization of the achievements of progress in the regions of individual countries, groups of them and the world economy as whole, that is, it becomes crucial to form a regional scientific and technical policy. On the other hand, integration processes in the development of productive forces and the observed strengthening of interstate division of labor lead to the formation of the world economy on the basis of them. This presupposes the existence both of varied and of general patterns in the influence of progress on the world economy, that is, there arises the task of developing a world (global) scientific and technical policy as well.

Undoubtedly, from the standpoint of political science as a theoretical-cognitive science one can assume that the regional and international scientific and technical policy must be regarded both as an independent phenomenon and as a part of a general scientific discipline--the theory of scientific and technical policy. The establishment of this theory will expand the structure of political science but it will not change the approach to understanding its object, which is formulated as "political systems in individual societies and their interaction on the international arena."* It should also be noted that for several years now certain questions of scientific and technical policy have entered the sphere of the interests of political scientists: the relationship between science and politics, and biology and politics. These and other more particular issues that are related to them were on the agenda of the 11th World Congress of the International Association of Political Science, the one before last, which was held in Moscow in 1979.

The most critical international problems that arise in the sphere of borrowing technology, purchase and sales of patents, new technical equipment, know-how, and so forth require a theoretical foundation for their solution. For mistakes in the practice of conducting the scientific and technical policy of one state or another in the international arena can also lead to technological dependency of the state. On the one hand this exerts an influence on the entire system of the foreign policy conducted by the state, and on the other, to the acquisition of technical equipment that is not adapted to conditions for operation in a given country, and it leads to negative results in the sphere of the state's economic activity as well. Here we are speaking not only about adapting

*Shakhnazarov, G. Kh., Burlatskiy, F. M., "On the Development of Marxist-Leninist Political Science," VOPROSY FILOSOFII, No 12, 1980, p 17.

technical equipment purchased abroad to the natural and climatic conditions of the country which has decided to use it, but also about the correspondence between the technologies that are introduced and the nature of the internal technological policy of the state.

Accounting for the regional factors in international scientific and technical policy is a crucial task for developed countries as well. Even in the USSR, a country that does not have direct scientific-technical and economic dependence on foreign deliveries, the national economic plans "are drawn up taking into account the intensive development of the economic and scientific-technical cooperation with foreign states."*

In economic and legal literature there are articles which reflect the research that has been conducted in this area. But the lack of development of the conceptual apparatus of the theoretical basis of the scientific and technical policy shows the need to consolidate the efforts of economists and sociologists along with political scientists and legal experts, and the need for them to conduct joint research. This is also clear from the published work of legal experts which is especially devoted to problems of the state scientific and technical policy. Thus in a number of works of M. P. Ring and V. P. Rassokhin published in recent years they do not deal with the regional aspect of the unified scientific and technical policy, which undermines the very "unity" in it if it is not based on a unity of branch and territorial approaches to the control of scientific and technical progress. Although M. P. Ring also noted that "The scientific and technical policy . . . is an instrument of combination and coordination of economic interests of individual collectives, regions and branches with national economic and statewide interests of science and technology,"** he does not reflect this either in his analysis of the system of control of progress in the country or in his proposals for accounting for the interests of the regions.

Planning and control of the national economy are based on a combination of branch and territorial approaches; the latter are not sufficiently utilized in the practical planning activity in the sphere of scientific and technical progress, and it is ignored in recommendatory documents and normative acts that pertain to control of progress. Regional scientific and technical policy can be defined as a part of the unified state scientific and technical policy interpreted in the socio-economic and natural-climatic conditions of the region as combining state and regional interests and capabilities, directed toward the achievement of the social and economic goals of the society.

The tasks of development of a unified national economic complex presuppose in the stage of mature socialism a harmonious combination of the whole and the part, the state and the region. Herein is manifest one of the facets, one of the salient characteristics of the totality and the degree of development of

*Shakhnazarov, G. Kh. "Gryadushchiy miroporyadok" [The Future World Order], Moscow, 1981, p 400.

**Ring, M. P., "The State Scientific and Technical Policy" in the book "Sovetskoye gosudarstvo v usloviyakh razvitogo sotsialisticheskogo obshchestva" [The Soviet State Under the Conditions of a Developed Socialist Society], Moscow, 1978, p 239.

socialism. The different levels of economic assimilation of regions, the nature of climatic conditions, planning and cultural peculiarities, and the unequal degree of development of the regional scientific and technical potential require accounting for all these differences in the approaches to solving scientific and technical problems in each region individually. Very frequently the regional scientific and technical policy is equated to questions of creating and introducing technical equipment that is adapted to conditions of the region in which it is to be used. Indeed, this is a very important aspect of the regional technical policy.

Nonetheless regional scientific and technical policy is a concept that is incomparably broader, which orients the scientific-production-consumer cycle of technical systems toward solving regional economic and social problems in order to achieve the final national economic results. A well-substantiated scientific and technical policy that is implemented in a region should reflect, for example, the regional balance of labor resources, the possibilities of growth of the energy availability for production, and so forth. While a labor-saving variant of the scientific and technical policy is effective in Siberia, in Central Asia, for example, it is based on the concept of creating technologies that provide for economizing on water consumption; the problem of labor resources appears quite different here.

Under the conditions of the increasingly strong campaign for economy and the search for reserves for increasing the efficiency of public production, a number of oblasts and regions have begun to develop territorial plans for scientific and technical progress. This kind of experience has been accumulated, for example, in Leningrad, Sverdlovsk and Irkutsk oblasts. In terms of their content these plans, which are sometimes called programs, are the summary of measures for scientific and technical progress of the enterprises and institutes located in the oblast. The indicators of the plans were not coordinated with other divisions of the comprehensive territorial plan. Nonetheless these "summaries" of measures served the oblast party of soviet agencies as useful material for controlling the course of the introduction of new technical equipment and technology in the oblast and the assimilation of new kinds of products and services. For in the majority of other branches of the country the introduction of new technical equipment--now a mandatory part of planning for all enterprises--is practically not controlled and, moreover, it is by nature exclusively devoted to the branch.

In addition to the aforementioned regions, one should also take note of the experience of Donetsk and Voroshilovgrad Oblasts. The Institute of Economics of Industry of the Ukrainian SSR Academy of Sciences has developed methodological recommendations for drawing up the comprehensive plan for scientific and technical progress in industry in Donetsk Oblast during 1976-1980. It made the first of the well-known attempts in the country to coordinate on an oblast scale measures for progress with the volume of output, its production cost and profit from sales, and so forth. The experience of Donetsk Oblast was approved in 1979 by the Commission of the Presidium of the Ukrainian SSR Council of Ministers for Questions of Scientific and Technical Progress, and it was recommended for extensive dissemination int he oblasts and cities of the republic.*

*See: "Sovershenstvovaniye upravleniya regionom" [Improvement of the Administration of the Region], Kiev, 1981, pp 58-63.

Research on problems of combining the territorial and branch approaches to control and planning of scientific and technical progress and the aforementioned practical testing of their results has determined regional programs for scientific and technical progress to be an effective instrument for solving these problems. These programs are a stage in the further development of the theory and practice of the program-special-purpose approach. As we know, in keeping with the decisions of the 25th CPSU Congress, the country developed for the first time, in addition to the five-year state plan, 208 scientific and technical programs whose implementation has been under the control of the USSR State Committee for Science and Technology. The 26th Party Congress approved this policy and under the 11th Five-Year Plan 170 more of these comprehensive programs were developed. But the experience of the preceding planning period demonstrated the need to eliminate the five-year limitation on the period for their functioning, to submit the results of scientific development for industrial assimilation, to strengthen the interconnection among programs, and so forth. This was reflected in the new complex of programs: 54 of them go beyond the five-year plan, and 41 are special-purpose programs that are oriented toward extensive publication of new scientific and technical decisions. The main tasks of the programs were included in the State Five-Year Plan for the Economic and Social Development of the USSR During 1981-1985, and the special-purpose programs themselves assumed the nature of specific directive documents.*

In keeping with the decree of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing the Efficiency of Production and the Quality of Work," of 12 July 1979, regular development was introduced for a comprehensive program for the country's scientific and technical progress for 20 years, which should be reworked and refined every 5 years. This program and the comprehensive and special-purpose scientific and technical programs that are included in it, by considerably expanding the horizon of centralized planning, should be concretized not only in the branch cross-section, but also at the regional level. In this connection one should consider regional programs for scientific and technical progress as well. The reflection of regional peculiarities of progress in them makes it possible to reveal new reserves for making it more effective and economical.

The first experience in developing regional programs also took place during the years of the 10th Five-Year Plan. At the republic level the program-special-purpose approach to scientific and technical progress was applied in the Latvian SSR, the Ukraine, Belorussia, Moldavia and Estonia. In Belorussia, for example, 50 organizations from a number of ministries and departments and 11 VUZ's participated in the implementation of 20 of the most important comprehensive programs with coordination of the republic Academy of Sciences. The effect from the introduction of the results of these programs into practice exceeded the volume of financing for them 4.3-fold.**

*See: Marchuk, G., "Comprehensive Programs for Scientific and Technical Progress," IZVESTIYA 26 January 1982.

**See: "Forms of Integration of Science and Production," VESTNIK AN SSSR, 1981, No 8, p 57.

Among the programs for scientific and technical progress that have been developed for large economic regions, one can also note the super program Sibir'. The program-special-purpose approach has also been applied on a city and oblast (kray) level. A comprehensive program has been drawn up for accelerated growth of labor productivity in Sverdlovsk Oblast. Regional programs have been developed in Tomsk, Leningrad, Donetsk and Voroshilovgrad oblasts and in Moscow, Leningrad and Krasnoyarsk Kray. One can say that an entire system of regional programs has taken form at various levels, on various scales, for various durations, with various availability of resources, and so forth.

The comprehensive program for the country's scientific and technical progress which was developed for the period of 1981-2000 presents the regional aspects of progress in an individual 2-level section which includes, in the first place, a description of the scientific and technical level of the economies of the regions of the country, the most important scientific-technical and socio-economic problems of their development, and a prediction of the influence of progress on the distribution of productive forces. The second level of this section is the program for the progress of union republics and individual regions, territorial production complexes of large cities and city agglomerates. The comprehensive program for scientific and technical progress in the country was developed with inadequately tested methodological instructions which will require further improvement. In particular, it is justified not to include fully in the unionwide program those programs of narrower territorial units, but to include them in it only through the total data and provisions.

On the whole the hierarchy of regional programs can be presented as a system of comprehensive programs for scientific and technical progress of the union republics, large economic regions, oblasts (krays), autonomous republics, large cities and territorial-production complexes. These programs, like the Comprehensive Program for the Scientific and Technical Progress of the USSR, are developed for a period of 20 years. They are the determining material when preparing plans for the development and distribution of productive forces of these regions and they serve as a prognosticatory stage and a conceptual device for developing regional research, preplanning research, scientific-technical, introduction and other regional programs whose measures are reflected in the five-year plan for the economic and social development of a given region.

Regional scientific and technical programs, as one of the kinds of regional programs for scientific and technical progress, serve, moreover, to approximate the union special-purpose scientific and technical programs and the implementation of the part of them that pertains to the given region. They also reflect measures of branch (ministry and department) programs for technical development and renovation, influencing the development of the productive forces of a given region to a considerable degree. They are intercoodinated with the social programs of a given region and with the system of regional programs for scientific and technical progress. Some of them--programs for preplanning investigation--are related to geological and economic evaluation of the territory, engineering research and territorial planning work, while others embrace with varying degrees ofcompleteness the stages of the scientific and production cycle (for example, programs of fundamental research that are being conducted by regional subdivisions of the Academy of Sciences).

The experience accumulated in the regional approach to processes of development and realization of the achievements of scientific and technical progress has revealed, among other things, impeding aspects that can be eliminated by adopting legal acts that reinforce the practice of a number of regions of the country. This pertains above all to the legal status of state agencies and public organizations that participate in the development and implementation of regional programs for scientific and technical progress. Since regional plans and programs for progress must be coordinated with the entire system of territorial planning, it is natural that the main agencies that began to conduct this work were the planning commissions of the ispolkoms of the kray and oblast soviets of people's deputies and the Gosplans of the autonomous republics.

But in practice the planning commissions do not adequately analyse the plans of the enterprises and organizations for the development of science and technology. Thus at the level of the territorial hierarchy the plans for economic and social development are not comprehensive enough since they are not interconrdinated with the indicators of the effectiveness of scientific and technical progress.

Experiments in territorial planning and programming of progress have confirmed the need for this approach, in connection with which there arose the task of reflecting in the normative acts the rights and responsibilities of these agencies in the sphere of scientific and technical progress. There must be especially clear-cut legal regulation of the policy for interrelations among kray (oblast) planning commissions, Gosplans of the autonomous republics and the USSR State Committee for Science and Technology, and enterprises and scientific organizations that are located in other oblasts (and also other union republics) but are participating in the implementation of the regional program for scientific and technical progress in a given oblast. The kray (oblast) planning commissions could exercise control over the course of the implementation of all assignments of the program, but the practice of this interaction is still not regulated. Here, in our opinion, is a shortcoming in legal support. Even in the tables of staff distribution of these commissions there are no planners who are responsible for the work in the sphere of scientific and technical progress.

The beginning of work in the oblast and kray for territorial planning in this area makes it necessary to create agencies to carry it out. There is positive experience in solving this problem in Donetsk Oblast. Here in the organizational structure of the planning commission of the ispolkom of the oblast soviet they have created a division for territorial planning of scientific and technical progress which, in conjunction with the Donetsk Scientific Center of the Ukrainian SSR Academy of Sciences, coordinates all work conducted in the Donbass for the development of long-range plans and programs for progress.

The expansion of the functions of the soviets of people's deputies leads to drawing increasingly broader masses of workers directly into the sphere of their activity. There is a strengthening of territorial social ties among labor collectives of the given region, that is, there is a process of formation of a territorial collective. But "the problem of the functioning and development of territorial collectives . . . cannot be reduced simply to questions of

organization and activity of the corresponding local soviets, but is comprehensive in nature."* This point is fully realized in the processes of the development and implementation of regional programs for scientific and technical progress. In them, in addition to legal commissions and other agencies ofthe soviets, the activity of the population of the region in this area is coordinated and directed by various social councils for influencing scientific and technical development, scientific and technical groups, and working commissions for individual areas of the creation and application of new technical equipment in the national economy of the region. For example, in Leningrad and Novosibirsk Oblasts and Krasnoyarsk Kray, there are public councils for developing and applying industrial robots in the region's economy. The majority of kray and oblast party committees have scientific, technical-economic and other types of councils that join together the efforts of scientists and the engineering and technical community of the region in the sphere of developing and implementing the regional scientific and technical policy. Thus the creation of a system of regional control of scientific and technical progress contributes to the formation of regional scientific and technical collectives.

In connection with the preparation of regional programs in all the republics and economic regions of the country as parts of the unionwide Comprehensive Program for the Country's Scientific and Technical Progress During 1986-2005, they have created councils for the development and implementation of regional programs. On the whole all work for the preparation both of the unionwide program and of its regional divisions is entrusted by the country's directive agencies precisely to those public councils and commissions. Consequently, it is a crucial problem to develop unified provisions concerning the activity of these collectives.

The question of regulating the functions of all agencies and organizations involved in the processes of creating and implementing regional programs requires a most rapid solution. Interpretation of experience and theoretical analysis of the phenomenon make it possible to suggest a distribution of the levers of the mechanism for administration of the implementation of the program among participants in these programs and organizations related to its implementation. Here, in our opinion, it is important to determine which agency can act as a client for the program. If the regional scientific and technical program has unionwide significance and involves state interests (for example, the program KATEK and Far East), then the client for its development and implementation, by analogy with the economic programs, should be the consolidated division of the country's Gosplan. The task of responsible workers and coworkers in the kray (oblast) organizations and in large enterprises consists in providing for efficient implementation of the program measures, and also their coordination. The council for implementing the comprehensive program is called upon to render effective assistance to the kray (oblast) planning commission and also the lower structural units in carrying out control functions. From the very beginning of the activity of the council, it should

*Yastrebov, V. I., "The Participation of Workers in the Administration of the Socialist State and Society (the Constitutional Aspect)," SOVETSKOYE GOSUDARSTVO I PRAVO, 1981, No 3, p 23.

organize reports at its meetings concerning the course of conducting program measures. As a result it will become possible to develop more correct measures for eliminating shortcomings and conflicting situations that appear. It is expedient to make the kray (oblast) Gosplans and the republic Gosplans responsible for functions of the head coordinator of the program, and the manager should be the deputy chairman of the planning commission. The manager should organize an executive agency as part of the division for long-range planning and the division for territorial planning of scientific and technical progress of the kray (oblast) plan. Then it seems that the directly coordinating function should be the responsibility of the division for territorial planning and the curators of programs who have been appointed as part of the division for long-range planning.

Such are the main elements of the structure of the organizational and economic mechanism for implementing regional programs for scientific and technical progress at the level of the krays, oblasts and autonomous republics. Still, the comprehensive approach to scientific and technical progress requires the participation of local soviets in all of the main directions of the development of productive forces and production relations in the region. Thus the functions of control of progress in the region should be carried out not only by the planning commission, but also by many agencies of the kray (oblast) ispolkom (the financial division, the division for labor, the statistical administration and so forth). But now the structure of the kray (oblast) ispolkoms does not have divisions (or officials) whose tasks are to coordinate all of the work for control of scientific and technical progress in the region.

It is also necessary to have clear-cut regulation of the policy of the direct correlations among enterprises, institutes and various departments that participate in regional programs. The long period for the implementation of these programs provides stability for the collective participating in it and thus makes the contract the most acceptable form for production relations of the coworkers. This, incidentally, manifests once again the influence of the law on the nature of socialist production relations.

One should think especially about the legal status of regional branches and centers of the USSR Academy of Sciences and union branch academies. They serve as poles around which the efforts of departmental research organizations and the entire scientific research potential of the region are concentrated. There are plenty of examples of this in the work of the Siberian Branch of the USSR Academy of Sciences, the Western Scientific Center of the Ukrainian SSR Academy of Sciences, and so forth. Here it is necessary to have legal regulation of the mechanism of the interaction between the USSR Academy of Sciences and the branch scientific research institutes and industrial enterprises. A lack of it impedes cooperation of efforts in the sphere of the development of scientific and technical problems for the development of productive forces of the regions. It would be expedient to discuss precisely cooperation in work (and not only coordination) of scientific and production collectives. Questions of the interaction of academic institutions with other participants in regional programs and their mutual responsibility should be especially defined. As of today the authority of the USSR Academy of Sciences, like that of the USSR State Committee for Science and Technology, is not reinforced by legal acts which would make

their decisions absolutely mandatory for organizations under their jurisdiction in the sphere of scientific and technical progress. And under modern conditions this is extremely necessary.

In the development and especially in the implementation of measures of regional programs, an important role is played by the head organizations which are most frequently also academic institutions). Here it is important to define the sphere of possible active influence on the processes of the scientific-production cycle by participants in regional programs, especially head organizations, responsible officials, and program coordinators.

The regional program for scientific and technical progress integrates practically all possible kinds of state influence on the processes of the control of progress. But the processes of the regional program can be conventionally divided into 3 groups. The first includes primarily processes of implementing program measures within individual organizations, and the second--processes of interaction among coworkers and the determination of their authorship and invention rights. Finally, it is necessary to have new norms that regulate processes of comprehensive control of the regional program as a whole. Here we are speaking about the law as a lever of influence. From this position it is clear that at the level of the enterprises and institutes special incentives for high-quality and effective resolution of the tasks of the program require local legal regulation.

It is difficult to tell the degree of detail the legislative acts should reach, but it seems that there are specific questions that require more clear-cut legal formulation. These include questions of the activity of the social councils of regional programs, legal organization of the procedures themselves for developing programs (at the present time they practically do not exist), special-purpose financing, and the functions of the ministries, departments, institutes and enterprises that are participating in the program. The economic and legal problems are: the determination of the group of directive and calculation indicators of the programs, the development of methodological instructions for preparing and implementing them, and the utilization of economic agreements as forms of interaction among executors of the program. As for individual specialists who participate in drawing it up, here it is necessary to have legal reinforcement of such already existing economic and organization relations as release from their basic work in order to prepare the regional program. For "the law . . . sanctions existing relations."*

Regional programs for scientific and technical progress are an important, extremely effective, but not the only organizational form and method of realizing regional scientific and technical policy and they are far from the only problematic aspect of this policy which generally requires legal research and confirmation. The provisions of the regional scientific and technical policy are strengthened in statewide legal acts through the law-creating principle of democratic centralism which is not adequately realized today in the sphere of control of scientific and technical progress.

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*Marx, K., Engels, F., "The Holy Family, or Criticism of Critical Criticism. Against Bruno Bauer and Company," Soch. /Works/, 2d ed., Vol 2, p 208.

Scientific literature sometimes raises alternative issues of legal or economic regulation of the processes of scientific and technical development. With respect to regional problems the legal mechanism should be developed in interaction with economic ones and reflect new tendencies first as recommendatory documents and then as legislative acts. This issue concretizes one of the general tendencies of Soviet law--expansion of the sphere of legal influence on the processes of development of productive forces and productive relations. Additionally, implementation of the regional scientific and technical policy and recognition of the patterns of the economy of regional technologies lead to further deepening of the practical effectiveness of the law itself and make it possible to orient the legal acts that are applied more precisely toward contributing to the achievement of final national economic results.

1772
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OBSTACLES TO NEW IDEAS DEPLORED

Moscow SOVETSKAYA ROSSIYA in Russian 11 Mar 83 p 1

[Article by Academician V. Koptyug, chairman of the Siberian Department of the USSR Academy of Sciences: "Barriers at the Introduction Stages"]

[Text] A critical situation developed last fall at one of the gas wells in the south of the country: for a month and a half the workers tried to curb a powerful flaming gusher by the traditional fire-fighting methods, but to no avail. Then they decided to test the blasting eddy powder method developed by the scientists of the Institute of Hydrodynamics in the Siberian Department of the USSR Academy of Sciences jointly with the Administration of Fire Protection under the Administration of Internal Affairs of the Novosibirsk oblispolkom. It only took a day to put out the fire. This is one of the examples of how academic science finds a direct outlet into practice. Very often it permits more than a simple improvement, in this case, a basic change in the situation. This is quite natural. Accelerated development of fundamental science, its constant "running" ahead, its scope, that is namely its fundamental nature, also help to find basically new ways to solve practical tasks.

I will cite another example. Extensive scientific research done in the Institute of Catalysis in the Siberian Department of the USSR Academy of Sciences afforded basically new forms of organizing the catalytic processes, with nonstationary, program-controllable mode. It was thus possible to effectively remove sulfur from exhaust gases of industrial productions, and recover for the needs of heat engineering the low-calorie gas mixtures, including even mine methane, that was previously emitted into the atmosphere. The nonstationary mode in the traditional process of sulfuric acid production will reduce the capital outlays for construction of units several times.

I would like to focus attention on yet another feature of basic research results, plurality and unique "fanning out" of their emergence into the production sphere. Thus, the development by Academician M. A. Lavrent'yev, and then his students in the Institute of Hydrodynamics in the Siberian Department of the USSR Academy of Sciences of the theory of rapidly occurring processes, including blasting, brought to life a cascade of technological solutions in different sectors: reinforcement, welding and drop forging of metal items, blasting molding of powders, removal of burrs and application of powder coatings to parts using detonation waves, blasting method of molding in installing high voltage line conductors, and the aforementioned fire extinguishing at oil and gas wells using the eddy ring created by a blast.

In a word, it seems that there is no need to prove the high practical yield of basic research. In this respect one cannot help but be perturbed by questions concerning the financing and material support of academic science. There has been a trend in recent years for a lagging in the rates of increase in budget financing for research behind the rise in volume of work done. This forces the institutes to increase the percentage of contract subjects. In many cases, this has a comparatively narrow orientation, and its excessive growth could undermine the base of basic research. To a certain measure, this trend restricts the further development of academic science in Siberia. Can it be considered normal that such economically important regions as Kuzbass, Tyumen, Omsk and Altay are essentially not covered by the network of academic institutions? The Siberian Department is doing a lot of work in this area, however, the creation of new institutes and subdivisions is generally done without target isolation of additional resources and a number of associates. Consequently, many of the created subdivisions have not reached the dimensions to guarantee their normal functioning, and are frozen for an indefinite time.

The sector science is in a better position in this respect. In financing, material-technical support and number of workers, it sometimes considerably exceeds the academic in a number of sectors. However it does have its problems. One of the acute problems is the comparatively low cadre potential of the scientific research and design organizations on the periphery. For example, these organizations have 3.5-fold more associates than the Siberian Department of the USSR Academy of Sciences and 3-fold fewer doctors of sciences. It is precisely this shock force of science with high creative potential which guarantees results from work.

The Siberian Department of the USSR Academy of Sciences has accumulated extensive experience in interacting with sector science. The formed system includes cooperation in the framework of direct contracts, and through comprehensive coordination plans which are compiled by our department jointly with the ministries. There is a very important example of cooperation between academic, sector and VUZ science in the execution of a large-scale comprehensive regional program "Siberia." But here there are also barriers which often inhibit the advance of new ideas.

One of them is the monopoly position of the main sector institutes. According to the existing order, none of the developments suggested to the ministry can be introduced into production without their support. This is a type of protective mechanism which helps to avoid making insufficiently worked out or erroneous decisions. It unfortunately allows the main institutes to occupy the position of "so what if it is a little worse, at least it is our own." This inevitably influences the fate of new developments proposed by "outside" organizations. This question can possibly be successfully solved by improving the role of extradepartmental evaluation of the level of new developments and expanding the possibilities of influence by the USSR State Committee on Science and Technology on the sectors.

However, production itself, or more accurately, its lack of interest, and often the lack of opportunity to assimilate the promising developments are becoming the "tightest place" in the penetration of new ideas into production practice today. If society has a technical need, then this will advance

science more than a dozen universities, F. Engels wrote. We are now frequently running into a situation where this obvious situation is not working out.

I will cite a characteristic example. New ideas and solutions that were found in designing the research accelerators on back beams indicated to the scientists of the Institute of Nuclear Physics of the Siberian Department of the USSR Academy of Sciences the possibility of creating small-sized effective units for industrial purposes. Having a fairly strong planning-design and production base, the institute not only guaranteed the development of technical documents and the output of small series of different types of accelerators, but also supplied about 70 units to different sectors of industry. Their use improves the resistance of cable coatings, thermal resistance of polyethylene pipes, and destruction of granary pests. The total economic effect from using the accelerators at the enterprises of the Ministry of the Electrical Engineering Industry alone is about R 100 million.

Thus everything is available for the broad introduction of these promising units: technical documents, technological experience, cadres who can promote with skill the assimilation of the accelerators by industry, there are guaranteed markets within the country and abroad, and developments are underway which ensure updating of the devices in the future. Nevertheless, for many years this business has been at a standstill. Only last year with the active support of the Novosibirsk party obkom, did the Ministry of the Electrical Engineering Industry make a decision for joint work of the two production associations of Novosibirsk and the Institute of Nuclear Physics to organize series output of the accelerators.

It is our opinion that in order to overcome the difficulties accompanying the existent practice of introduction, it is necessary to correct the system of planning the sphere of material production. This primarily means setting the permissible schedules for the use of each technology and the manufacture of each type of product. Material stimulation of the enterprise workers should be the maximum in the first period of work on the new technology and zero or even negative after the end of the established "lifetime" of the technology. The level of technology and items should be evaluated by an extradepartmental agency with mandatory consideration for the export opportunities. At the same time, real opportunities for updating should be created for production. Facility reserves should be left for reconstruction and assimilation of the new when it is planned. The enterprises should have more opportunities for creating experimental-industrial units and experimental shops where a lower percentage of capital investments to the main plants is now stipulated. Experience proves that without this type of improvement in planning in production, we cannot fully utilize the advantages of our system of management.

Direct ties with specific enterprises play an exceptionally important role in the relationships between science and industry.

The cooperation of our department with the Novosibirsk Aviation Plant imeni V. P. Chkalov, production associations "Sibelektroterm" and "Sibsel'mash" are examples of this interrelationship. For the first time in the country, the plant imeni Chkalov introduced hydrodynamic drop forging of items using blasting which was suggested by the Institute scientists. It was disseminated to other plants in the sector. Treatment of materials with slow loading during heating (in a mode of superplasticity) followed the same route.

Cooperation of academic science and industry is now being effectively developed in other cities of Siberia where scientific centers of the department are located, in Tomsk, Krasnoyarsk, Irkutsk, Yakutsk. The active position of the oblast and kray party committees plays an exceptionally important role in this work.

Unfortunately, in the framework of the formed and successfully developing cooperation between the department and the ministries and departments, now only those problems in which the sector itself is closely interested are being effectively resolved. The ministries usually do not hurry to show an initiative in work of an intersector nature. In these situations there is a more acute need for further development of the in-house design and experimental-production base of the academic institutes. A good illustration here is the aforementioned story of the accelerators. The USSR State Committee on Science and Technology plays a large role in overcoming the departmental separation in individual, most important directions, including by realizing the target comprehensive programs. Solution to the major national problems could be accelerated by creating intersector scientific-technical associations under the aegis of the USSR State Committee on Science and Technology and the USSR Academy of Sciences.

Intersector orientation is clearly not sufficient in our "zone of introduction," the system of sector institutes and design offices concentrated around the Novosibirsk scientific center of the Siberian Department of the USSR Academy of Sciences, and called upon to accelerate transfer of scientific developments to the national economy. They can attract skilled specialists and use the scientific developments of the institutes. As a result the ministry will assimilate technical and technological innovations in a short time. The total economic effect from the subdivision developments which are included in the "zone of introduction" from the time of its existence has been over R 4 billion. At the same time, in certain design offices, the studies which are a development of the scientific reserve of the academic institutes are only a small part. They are mainly loaded down with the current assignments of the ministries. But if this is so, then their location in the zone of the Novosibirsk academic city is completely unjustified. It would be more expedient to transfer them to the Siberian department or subordinate them directly to the USSR State Committee on Science and Technology.

The November (1982) Plenum of the CPSU Central Committee, continuing the line of the 26th Party Congress, once again stressed the exceptional significance of the problem of intensifying the national economy, required detection and elimination of specific difficulties which interfere with scientific and

technical progress. The country awaits from the scientists new basic results in all areas of science, more active influence on improving the productivity of social production. The scientists clearly recognize the entire measure of their responsibility to society. But the goal has to be approached from two sides. The scientists should intensively and responsibly bring their developments to a level where they can be adopted by industry. But even more important, industry must be closely interested in the work of the scientists.

9035
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PILOT INDUSTRIAL WORKS

Moscow EKONOMICHESKAYA GAZETA in Russian No 29, Jul 83 p 10

[Article by G. Glagoleva, senior scientific associate of the Institute of Economics of the USSR Academy of Sciences: "The Development of Pilot Works"]

[Text] The creation and development of fundamentally new equipment is a complex, labor-consuming process which requires considerable time and capital. The continuity and completeness of the planning of the "science--production" cycle, the efficient organization of the work on the development and introduction of a new technical decision at each stage and an economic interest in the quickest possible use of new equipment are necessary conditions of the shortening of the time of the implementation of innovations.

The level of development of pilot works in many ways determines the degree of elaboration of fundamentally new scientific decisions, which ensure the development of new equipment and technology, which in their technical and economic parameters and indicators surpass the best domestic and foreign analogues. Thus, the Moscow Motor Vehicle Plant imeni Likhachev, the VNIImetmash Scientific Production Association, the Leningrad Elektrosila Production Association, the Institute of Electric Welding imeni Ye. O. Paton of the Ukrainian SSR Academy of Sciences and many others, which have a well-equipped pilot base, are producing products which are protected by inventor's certificates and patents and are widely known on the world market.

In indicating the need for the fundamental increase of labor productivity, Yu. V. Andropov noted: "The main means to the qualitative improvement in the productive forces is, of course, the changeover to intensive development, the combination in practice of the advantages of our socialist system with the achievements of the scientific and technical revolution.... An enormous amount of work on the development of machines, mechanisms and technology of both today and tomorrow awaits us."

The State of Pilot Works

In spite of the considerable development of pilot experimental production in recent years, the situation here still needs serious improvement. Only about half of the scientific institutions of the country have a pilot base. The provision of industrial enterprises in the leading sectors of machine building with them fluctuates within the range of 40-60 percent. As a result 20 percent of the total number of operations, which were proposed for introduction in production, were not used due to the lack of possibilities for experimental checking.

The sample surveys made by the Institute of Economics of the USSR Academy of Sciences showed that the average annual number of workers in the pilot shops is less than 90, while in pilot sections and workshops it is about 20. The average number of workers of pilot plants is significantly greater. For example, in the USSR Ministry of the Petroleum Industry and the USSR Ministry of the Petroleum Refining and Petrochemical Industry it exceeds 600, but the proportion of such plants in the total number of pilot production bases of scientific institutions is negligible.

The creation of pilot experimental works at all enterprises is economically inadvisable. The prospects of development lie in their cooperation. Pilot bases on a cooperative basis could serve a number of enterprises which are close in the specialization of the output being produced. This will provide a significant saving of the assets being spent on science.

For Pioneering Developments

The role of pilot works for the development of fundamentally new highly efficient equipment, which is based on major inventions which are of great national economic importance, is especially increasing.

The pioneering scientific and technical developments at the experimental stage differ substantially from the work in the traditional direction. Here the number of stages of the experimental check and their participants increases, new pilot industrial plants are set up, the primary designing of construction and the assimilation of new projects take place. The difficulties increase significantly during pilot industrial checking, since it is necessary to develop materials with new properties, to install new equipment with increased precision and to conduct additional studies.

As a result the labor intensity of the production and testing of prototypes increases, the uncertainty of the dates of the completion of the work increases. The development of fundamentally new equipment is impossible, moreover, without pilot production for the conducting of tests of the new equipment, the development of new technology under pilot industrial conditions and the assimilation of new industrial production. Usually this involves additional capital investments, but there is not always the certainty that all the expenditures on the development of the pilot production base can be recovered.

The technical equipment of some pilot experimental bases at present lags behind the requirements of science and technology. It is desirable to expedite the updating of the active portion of the fixed capital in pilot production. For the speeding up of the development under pilot conditions of the fundamentally new equipment, which is being created, it is important to increase the attention to the qualitative aspect of the pilot potential and to strive for the conformity of the production base of pilot works to the specifications and requirements of the forthcoming production. In the long-range plans, therefore, it is advisable to envisage the priority retooling of pilot works.

In our opinion, in addition to centralized sources of capital, it would be possible to increase the internal sources of the financing of the reproduction of fixed capital and to elaborate long-term and favorable standards of the capital for the retooling of pilot works.

The inadequate development of the production capacities of pilot works frequently makes the assimilation of fundamentally new equipment difficult. Preference is given to operations, which continue the already established directions and are oriented toward the development and improvement of the products being produced and the technology being used. Thus, the study of the themes of scientific institutions in the Ukrainian SSR showed that much research and development is still connected with the improvement of already existing themes.

The Economic Aspects

So that the development and introduction of major fundamental technical innovations would not be checked at the stage of pilot experimental production, it is necessary, first, to considerably expand and strengthen its material and technical base. Second, it is expedient to take steps of an organizational and economic nature, particularly on planning and financing, which ensure the rapid passage of fundamental innovations at the experimental stage.

Now in the industrial ministries the proportion of the allocations for the construction of pilot works, as a rule, does not exceed 1 percent. And even those assets are not being completely assimilated. As practical experience shows, the level of fulfillment of the plan of the construction of pilot bases in all sectors is considerably lower than for construction as a whole. The annual capital investments in the creation of experimental bases, as estimates show, should come to not less than 2-3 percent of the annual amount of capital investments in the sector.

It is possible to remedy the situation, in our opinion, by having created favorable conditions for the organization of pilot and pilot industrial facilities. It seems necessary to simplify the procedure of the approval of the plans and estimates for their construction and their inclusion in the title lists and to increase the stimulation for timely placement into operation. It is advisable, apparently, to pay the bonuses for the placement into operation of the basic start-up projects of the sector on the condition of the placement into operation of all the pilot industrial plants and experimental bases, which were planned for the same period.

As is known, one-time bonuses from the unified fund for the development of science and technology for enterprises and organizations of machine building are envisaged for the development, assimilation and mass production of especially important and highly efficient types of equipment and machines, as well as for the development and assimilation of fundamentally new technological processes. It would also be useful to extend this procedure to other sectors.

It also seems necessary to distinguish during planning the especially important developments and to introduce measures of the promotion of the acceleration of developments in the form of priority resource supply and the performance of auxiliary operations out of turn.

Thus, of the total amount of experimental work it is expedient to single out the assignments on the creation and development of fundamentally new types of products and technological processes and patentable items and to envisage an increased amount of the bonus for their successful fulfillment.

The organizational rearrangement could include the streamlining of the structure of the pilot works, their integration with scientific research organizations and enterprises, the creation of scientific and technical complexes and the sectorial and territorial cooperation of the experimental bases. In our opinion, along with small pilot facilities and sections it would be possible to set up pilot plants, sectorial and intersectorial centers and interdepartmental pilot experimental bases, which operate in accordance with contracts.

7807
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OBSTACLES TO INNOVATION INTRODUCTION REVEALED

Moscow SOVETSKAYA ROSSIYA in Russian 26 Feb 83 p 2

[Article by N. Shilo, academician, chairman of the presidium of the Far East Scientific Center of the USSR Academy of Sciences: "Progress and Bureaucratic Interests"]

[Text] It has already become a custom that as soon as a new idea comes up which is important for scientific development and is a promising technical solution, almost mandatorily a question is raised about the difficulties accompanying its introduction into practice. The inevitability of these complications seems to have been primordially instilled in the very terminology. It is customary to speak not about the transition or transmission of something new into production, but namely the introduction which implies a certain forced penetration.

But we are concerned, of course, not so much with the formulas, as the actual phenomenon, those subjective, and sometimes objective reasons which at times bar the way to the new. The November (1982) Plenum of the CPSU Central Committee spoke about these reasons in the articles and interviews published on the pages of SOVETSKAYA ROSSIYA. And we, the Far East scientists, would like to express our opinions.

I will begin with figures. In the 10th Five-Year Plan, the institutes of the Far East Scientific Center transferred 547 projects to the national economy with economic effect of over R 32 million. This is a lot. In any case, a lot more than in the previous, Ninth Five-Year Plan. Our creative satisfaction would have been more complete, however, if we had known that this sum was a real contribution to the republic budget and that the money obtained from our developments had built hospitals, schools and enterprises. Unfortunately, the extant practice of introducing innovations stands in the way of converting the expected income into a tangible profit.

The introduction plan is simple in principle: laboratory - experimental production - shop. Which link slips in this chain? The scientist of the Far East Scientific Center considers experimental production the primary work. The development of the experimental base of the Far East Scientific Center is currently being held back by a shortage of construction facilities and resources. Without the modern easily reorganized experimental production,

many valuable innovations on which many resources have been expended remain ideas for a long time, hanging in the air. The importance of this production is confirmed by the example of certain academic institutes in the Ukraine that have miniplants where development reaches technical-economic substantiation, that is, the enterprises not only receive the idea, but all the necessary data for industrial planning. It is remarkable that the creation of the experimental shops has not placed a heavy financial burden on the institutes, but on the contrary, has allowed them to switch to cost accounting.

If there is a serious concern for enhancing efficiency, each more or less large enterprise should also have its own experimental shop, scientific-technical laboratory, in a word, full service for introducing the idea. It is true that the expert will say that each sector has its own institute. This is true, and moreover, the enterprise is obliged to accept projects only through the main scientific research institute. But there is little advantage to this monopoly, unless it simplifies the office work: it is simpler for the ministry to solve any question about "its" science. A jam almost inevitably develops in the transmission of an idea that was born in an academic institution to the sector scientific research institute because it has its own plans. If it agrees to accept "somebody else's child," then it immediately begins to revise it, to redo everything in order to make its departmental contribution noticeable and to belittle the importance of the achievements of others. It does not have to be said that the hybrid that is born as a result of this "cooperation" is rarely viable. The experiment underway in the USSR Academy of Sciences, in our opinion, is a more acceptable form of creative cooperation. Some of its institutes have set up scientific-technical laboratories which jointly with a certain sector (and correspondingly, the sector scientific research institutes) conduct experimental-design developments, based on serious scientific research, create new materials, production processes and machines. One of these laboratories exists in the Far East Scientific Center, the Institute of Chemistry. It looks as if it is beginning to justify its existence. Work to make protective coatings for the underwater section of ships has been noticeably activated and results are already visible because of the close contact of scientists and specialists of different services in the USSR Ministry of the Shipbuilding Industry.

Of course the experimental base is not the only important aspect. There is a lot of misfortune if there is no flexible and efficient system of stimulation. The bonus fund for innovations is now very small. Therefore the scientist sometimes is not disturbed if his creation is put into the archives. But it is not only a matter of money. This situation forms a unique psychology in the researchers, especially the young ones: they say that it is their work to think, write and "move science," while let others be concerned about where to use the knowledge. These scientists look down upon contract work as hack-work. But it is yet another way to solve the problem.

The management of one of our institutes decided to intensify attention on contract work. A plan was drawn up, specific tasks were defined for each laboratory, and additions were introduced which evaluate the contribution of each colleague to introduction of the innovation. The new organization of work is not at all an obstacle to the fundamental problems, on the contrary, it reveals their significance more completely.

Another remarkable experiment has been conducted. The Institute of Automation and Control Processes of our center was recently obliged to produce packets of applied mathematical programs for the state fund. This fund only accepts those that are ready for industrial use. This circumstance forced the institute to review its organizational structure, strengthen the introduction department, and in the laboratories isolate the specialists who were responsible for bringing the programs to "commercial readiness." The work efficiency of the institute increased noticeably as a result.

Let us now look from another aspect. Say that we set up a system of stimuli, create a powerful experimental base, and make the scientists work in the name of the final result, but I catch myself thinking: aren't we making the researchers into pushers? Here is another example. A unit was recently made which allows all the necessary ore analyses to be obtained directly at the gold field. I myself am a geologist, and know well that this inexpensive compact apparatus is very promising. Two experimental units that have been made in our workshops are successfully operating for the geologists of the Magadan Oblast, and one in the seaside taiga. But why doesn't every expedition have one of these instruments? Because it is necessary to set up its series production, open up new shops, or re-orient some of the existing ones. Everyone understands that in the final analysis this will afford an enormous saving and jump in labor productivity. But now nothing interferes with working by antiquated methods.

A second fact. The mountain of unused lignin is growing daily by 700 T at the biochemical plant in Lesozavodsk. Our developments indicate that it could be both an inexpensive fuel and fertilizer, greatly enhancing the yields. But how can they be introduced? Should we ourselves build those simple structures and install the simplest equipment which is merely needed to convert the wastes into valuable raw material?

Obviously not. Everyone should do his own work. But now we have to admit that industry itself sometimes shuts itself off from new ideas by high and thick walls. Imagine that an amateur scientist comes to the director of the plant and says, spreading out his drawings: we have found how to improve your product. The expensive and scarce steel can be replaced by inexpensive, the wood by plastic, labor productivity will double and the saving will be in the millions! The director listens to his promises and feigns sadness: "This means that we will have to halt the conveyer for adjustment and no one will lower the plan for me. I could not come to an agreement with the suppliers, and now have to find others. What will happen to the workers' wages, and what kind of new plan I will be given, no one knows." After seeing the scientist out, the director tries not to remember his suggestion. If the scientist is too persistent, the plant will find some defect in the institute's suggestions and will build up a defense line with hundreds of arguments. One can understand the production engineers: gripped in thevises of the immediate planned tasks, there is no time or sense in thinking about tomorrow.

Any institute perhaps encounters similar sad stories. It is no accident that these same problems disturb Academicians V. Ye. Zuyev and A. I. Tselikov whose interview was recently published in SOVETSKAYA ROSSIYA.

Taking all this into account, what conclusion do you come to. The introduction of new ideas should be mandatory for any production. The system of accounting of a socialist enterprise together with price formation and wages formation should be correlated so that they force the managers to literally hunt for new ideas, and not shy away from them like forbidden fruit. The plan for each enterprise should always include, and not just in definite, especially important cases, a section of introduction: by what period should the innovation be assimilated, what should be series produced, by what not too distant year will the innovation guarantee the sector's or region's needs instead of the outdated model. Perhaps, in addition to the current planning, in the mandatory long-term plan there will be a renewal with regard for the technical achievements, and some type of "index of up-to-dateness" of production will be introduced.

Of course, sooner or later the new idea will make a path for itself in any sphere. But the more flexible the planning, the better we will learn to rapidly adjust the assignments with regard for the latest achievements, and the shorter the path from the idea to the conveyer will be.

9035
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IMPROVE UTILIZATION OF SCIENTIFIC AND TECHNOLOGICAL POTENTIAL

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 5, May 83 pp 31-33

[Article by Mark Il'in, Cand Econ Sci, and Antoliy Popoudin, MIEP MSS [International Institute of Economic Problems of the World Socialist System]:
"Rational Utilization of Scientific and Technological Potential"]

[Text] The growing importance of scientific and technical progress as a major factor in converting the economies of the countries of the socialist community to the intensive path of development places in the forefront the task of a planned management of the development of the scientific and technological potential of these countries and drafting a policy, along with measures to implement it, for combining most effectively the advantages of the socialist method of production with the achievements of the scientific and technical revolution. This task is being accomplished at present by all the CEMA member countries on the basis of both national plans for social and economic development and the evolving international socialist division of labor in science and technology.

As for cooperation and integration, enhancing their effect on scientific and technical progress at present requires a deeper investigation of the real processes occurring in the science and technology of the fraternal countries. Here an analysis of the status and growth rates of scientific and technical potential, particularly as regards the available resources, is of special importance.

Growth Rates of Scientific and Technical Potential

In view of the need to accelerate scientific and technical progress and strengthen the influence of science on the process of socialist reproduction in the countries of the socialist community, there has been a marked increase in both the material expenditures on scientific and technical activity and employment in the sphere of R&D [NIOKR—scientific research and experimental design work]. This happened because, in measure with the growing autonomy of science and technology as productive forces, scientific-technological complexes are being formed within the framework of national economic complexes in a number of countries. As a result the scientific and technological potential of these countries is growing, as is its importance to the development of material production.

In recent years expenditures on R&D have been rising in absolute figures in all the European CEMA member countries. Between 1970 and 1980 they grew by a factor of 2.1 in Bulgaria, 2.8 in Hungary, 1.8 in the GDR, 3.3 in Poland, 1.8 in the USSR and 1.6 in Czechoslovakia.

At the same time a declining trend in that growth rate has appeared. In particular, while during the 1970-1975 period the growth rate of R&D expenditures in Bulgaria was 48.4 percent, during the 1975-1980 period it was 42.0 percent, and the corresponding figures for Hungary were 80.0 and 56.4 percent; for Czechoslovakia, 39.3 and 15.3 percent. (For Poland during 1975-1980, 34 percent.)

The growth rate of scientific and technological potential often is determined with the aid of the indicator of the proportion of R&D expenditures in the national income. In most European member countries of CEMA this indicator has risen during 1971-1975. Subsequently it stabilized or even fell, with the exception of Hungary. On the whole, during 1970-1980, the proportion of expenditures on R&D in national income grew from 2.1 to 2.3 percent in Bulgaria, from 2.8 to 3.7 percent in Hungary, from 3.9 to 4.3 percent in the GDR, from 1.8 to 2.4 percent in Poland, from 4.0 to 4.7 percent in the USSR and from 3.6 to 3.8 percent in Czechoslovakia.

The trend toward a decline in R&D expenditures during the past five-year plan period as compared with the preceding period is to some extent due to the fact that the countries named above began to emphasize the intensification of activities in the scientific sphere. It is quite likely that for the next few years the proportion of expenditures on R&D in the national incomes of most European member countries of CEMA will remain roughly stable. Essentially this means that in absolute figures these expenditures will increase in proportion to the growth rates of national incomes.

During 1970-1980 the European CEMA member countries have come markedly closer to a similar level of expenditures per R&D employee in comparable units. The maximum deviation of that indicator from the mean decreased from 143 points in 1970 to 70 points in 1980, i.e. by a factor of more than 2.

The process of the equalization and optimization of the funds spent on R&D per R&D employee in the various socialist countries is promoted by a purposive scientific and technical policy based on the particular conditions and tasks of scientific and technical progress. This also manifests itself in the different trends and rates of change in that indicator in relation to the mean level of expenditures per R&D employee in the CEMA member countries over a specific period. This indicator rose most rapidly in Bulgaria, Hungary and Poland, where the establishment and strengthening of R&D facilities continued during 1970-1980. In the GDR during the same period the expenditures per R&D employee decreased roughly by 30 percent in absolute figures and have at present come close to the mean level of these expenditures in the European member countries of CEMA.

The stabilization of the abovementioned indicator in the USSR and Czechoslovakia may be explained to some extent by the fact that during the period preceding the 1970s these countries reached a certain optimum in forming their scientific and technological potential, which was maintained in subsequent years through a balanced growth of both components of the indicator (expenditures and personnel).

Structure of R&D

Of great importance to a proper coordination of scientific-technical and structural policies is maintaining the optimal proportions between the discrete types of R&D work—basic research, applied research and application projects. These proportions are reflected in the ratio among the current expenditures on the discrete types of R&D. During the 1970s no major changes took place in this ratio in most European member countries of CEMA. On the average this ratio amounted to 1.5:3.3:5.2 for these countries as a whole. But at the same time there appeared a tendency to redistribute the funds allocated for R&D in favor of applied research and application projects and reduce the share of expenditures on basic research.

It is hardly possible to specify a ratio among the R&D types that would be optimal for all the countries. This ratio depends on a large number of factors, among which allowance should be made for the attained level and evolved directions of scientific and technological development in a particular country, its specialization in R&D sphere, the level of development of its production potential assuring the materialization of the new knowledge gained, etc. At the same time, it is characteristic of all countries that their progress in the scientific and technical domain largely depends on the development of basic research. It is basic research that represents a source of new ideas, and its findings provide the basis for applied research, experimental-design projects and applications. It is precisely basic research that determines the main directions of the scientific and technical strategy and prospects of structural policy of the individual countries.

World experience shows that the ratio among the various types of R&D also depends greatly on the magnitude of the funds spent by a country on R&D work. In such countries as the USSR or the United States, which allocate huge funds for promoting scientific and technological progress, the share of investments in basic research is 10-12 percent. Although this proportion is lower than or equal to the proportions prevailing in other countries, the hugeness of these funds in absolute figures enables the USSR and the United States to pursue basic research in its entire variety.

When comparing the size of funds allocated for the different types of R&D work in CEMA member countries and the industrially developed capitalist countries, it should also be borne in mind that the relatively lower proportion of outlays on basic research in CEMA member countries is to some extent compensated by an intensive exchange of the findings of that research, conducted on gratis terms, particularly within the framework of cooperation among the academies of sciences of the CEMA countries.

In view of this, a coordinated scientific and technical policy designed to optimally exploit the combined resources of CEMA member countries allocated for various R&D purposes acquires a fundamental importance. It allows for both the internal factors and specific features of development in each of these countries and the possibilities for scientific and technological specialization and cooperation in the process of socialist economic integration.

Availability of R&D Assets

A rational utilization of the potential possibilities of R&D personnel is at present linked to the need to provide it with assets on a growing scale, and particularly with all kinds of scientific equipment, instruments, organized facilities, etc. This is needed to enhance the effectiveness and quality of both basic and applied research as well as of application work, and also to shorten the required R&D time, i.e. in the final analysis, to increase labor productivity in R&D work.

On the whole, the value of assets in the R&D sphere has risen markedly in most European member countries of CEMA during 1970-1980. Thus, in Bulgaria, Hungary, Poland and Czechoslovakia this value has more than doubled. The growth rates of assets in the R&D sphere during that period exceeded the growth rates of all production and non-production assets in these countries. This

points to a redistribution of the assets of the national economy in favor of increasing the share of assets in the R&D sphere.

The growth of the assets in the R&D sphere has been accompanied by a growth in the value of their active part (instruments, equipment, organized facilities, etc.). For example, in Hungary the proportion of scientific equipment and instruments in the total value of assets in the R&D sphere has during 1970-1980 increased by a factor of 1.4 and in Poland, by a factor of nearly 2. In Bulgaria and Czechoslovakia in 1980 the active part of the assets accounted for more than one-half of them.

In most European member countries of CEMA the fixed assets facilitating the labor of R&D personnel have been gradually rising (on the average by 150-160 percent during 1970-1980), but in some cases, in Bulgaria, Hungary, Poland and Czechoslovakia, their growth rate has been lagging behind the growth rate of fixed assets in various branches of state-run and cooperative industry per employee. In most cases the growth indicators of the increase in assets per blue- and white-collar employee for these countries as well as for state-run and cooperative industry as a whole and in its discrete subsectors, have exceeded 200 percent, which is much higher than the corresponding indicator for the R&D sphere.

R&D Personnel

As for the personnel component of the scientific and technological potential, an increase in the numbers of R&D personnel has been characteristic of all the European member countries of CEMA. This manifested itself in both the absolute increase and the change in the proportion of this category of manpower within the total blue- and white-collar employment in the state-run and cooperative sectors of the national economy. Between 1970 and 1980 the increase in R&D personnel amounted to 147 percent in the GDR, 142 percent in Bulgaria, 133 percent in Hungary, 123 percent in the USSR and 109 percent in Poland.

This increase was most rapid during 1970-1975. In the second half of the 1970s, the growth rate of R&D personnel slowed down in all the countries named above (except Czechoslovakia). In Bulgaria, Hungary, the GDR and Poland during that period the growth rate did not exceed 115 percent. During the same past five-year plan period the numbers of personnel engaged in science and scientific services in Rumania grew at a fairly high rate in Rumania (by 31 percent on the average).

In examining the proportion of R&D personnel in total employment in the state-run and cooperative sectors of the national economy, it should be considered tht during 1970-1980 this indicator too steadily climbed in most countries. A particularly high increase in the proportion of R&D personnel has been observed in Hungary (to 2.12 from 1.80 percent), the GDR (to 2.43 from 2.07 percent), Romania (to 1.50 from 1.15 percent), the USSR (to 3.89 from 3.32 percent) and Czechoslovakia (to 2.85 from 2.60 percent).

As a rule, in all the CEMA member countries during the 1970s the number of scientific workers increased at a faster rate than total employment in the R&D sphere, which points to a qualitative improvement in the structure of employment in that sphere.

During that period the structure of qualifications of the scientific workers themselves also has markedly improved owing to the increase in the proportion of persons with the degrees of doctor or candidate of sciences. For example, during 1970-1980, the proportion of doctors of sciences in Bulgaria increased to 2.8 from 0.8 percent and the proportion of candidates of sciences, to 35.1 from 19.3 percent. For Poland the corresponding figures were: to 6.0 from 4.2 percent and to 22.0 from 13.7 percent, respectively.

The growth rates of scientist personnel in individual branches of science reflect to some extent the development trends of science and the goals and priorities of the scientific and technical policy of the CEMA member countries. It is characteristic that, as our figures show, about 50 percent of all the scientists in the fraternal countries in 1980 specialized in technical sciences. The remainder mostly specialize in the natural and social sciences and the humanities (on the average 15-20 percent each in the total). At the same time, the proportion of scientists specializing in the agricultural sciences is comparatively low (on the average, 4-6 percent).

A rational utilization of the scientific and technological potential of the CEMA member countries requires establishing a scientifically substantiated optimal ratio between manpower and material-technical resources allocated for R&D work. In our opinion, such an optimum can be achieved both by expanding and improving the material-technical facilities and improving the structure of the qualifications of R&D personnel, reallocating manpower and material resources so as to back with them the principal directions of scientific and technological progress.

Even now the countries of the socialist community have no other alternative in accelerating scientific and technological progress except through a consistent pursuit of the intensification of R&D work. Of growing importance to accomplishing this important task is the coordinated utilization and interaction of their scientific and technological potential through the implementation of a mutually agreed-upon policy of scientific and technological development. The agencies of the Council for Economic Mutual Assistance are legitimately attending to these questions.

1386
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SCIENTIFIC, TECHNICAL RELATIONS OF SVEMA ASSOCIATION STUDIED

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 3, Mar 83 pp 58-63

/Article by G. Dobrov, professor, doctor of economic sciences (Institute of Cybernetics of the Ukrainian SSR Academy of Sciences) and V. Krut'ko, candidate of economic sciences (Shostka Svema Production Association): "Scientific and Technical Relations of an Enterprise"/

/Text/ The rise in the scale of utilization in the national economy of the achievements of science and technology naturally leads to the separation in the structure of economic relations of industrial enterprises of such a component of the latter as scientific and technical relations. This phenomenon reflects the fact that "in practice, science has already become a direct productive force, a productive force whose significance rises from day to day."[1]

The scientific and technical relations of an enterprise characterize relationships concerning the producers and consumers of new scientific and technical results isolated under conditions of the social division of labor. As a variety of economic relations these relationships are established in the process of consumption (that is, introduction, mastering and dissemination) of scientific and technical innovations for the purpose of increasing the efficiency of public production and meeting public needs characteristic of developed socialism in the maximum possible way. The intensification of relations in the "production-science" direction is an organic part of the overall task formulated by the 26th CPSU Congress: "...To strengthen the mutual relations of science and production."

In theoretical and applied aspects the scientific and technical relations of an enterprise have not yet been investigated sufficiently. In addition to that, in the structure of economic relations they are mentioned only indirectly and in the literature are discussed primarily in the "science-production" direction without proper attention to the specific nature of relations of production itself with science. At the same time, the need for improving the organizational and economic mechanism of control of these relations increases constantly and objectively.

An active development of various cost accounting forms of relationships of production and science now takes place within the framework of realization of the decree of the CPSU Central Committee and the USSR Council of Ministers on

the further improvement in the economic mechanism (1979). As the most promising form of the scientific and technical relations of an enterprise its direct relations based on economic contracts for scientific research and experimental design operations acquire ever greater importance.

In practice, the economic contractual and scientific and technical relations of an enterprise appear as an integrity including qualitatively and quantitatively nonuniform elements. We have analyzed 285 economic contracts for scientific research and experimental design operations fulfilled in 1973-1980 by 76 scientific research organizations in the country for the Shostka Svema Production Association, which includes the Shostka Affiliate of NIIkhimfotoproyekt (head organization for magnetic tapes) and the special design and technological office of Khimfotoprom (head organization for production equipment), which independently solve problems connected with the scientific and technical development of the mentioned association and the sector as a whole. A number of observations made in the process can be useful for the study of the relations of production with science.

In terms of the number of economic contracts and the stability of these kinds of relations of the customer enterprise with executor organizations the following three groups of relations of production with science are differentiated: I--relations on the basis of more than eight to ten economic contracts, most of which are stable and are directed toward the solution of problems of long-term production development; II--relations on the basis of two to seven economic contracts, of which more than one-half are occasional and are directed toward the solution of particular problems of interest to production; III--relations on the basis of a single economic contract, whose length of effect is problematic and depends both on the situation in production and on the results of these operations themselves.

Let us examine the characteristics of these relations as the element of economic relationships of a production association (see tables 1 and 2). We have shown the distribution of the average cost of studies: For the relations of group I it totals 50,000 rubles, for the relations of group II, 45,000 rubles and for the relations of group III, 20,000 rubles. At the same time, regardless of their group the length of 80 percent of the operations does not exceed 2 years.

Not only the number of performed economic contractual operations serves as the basis for the inclusion of mutual scientific and technical relations in one group or another. Their length and cost are also of great importance for this. All the three mentioned criteria taken together give the right to include the analyzed relations in a specific group. For example, the first group includes relations on the basis of eight to ten economic contracts, but with due regard for the fact that the average cost of each of these studies reaches no less than 50,000 rubles and the cost of 60 percent of all the operations is about 20,000 rubles each. The outlook for these operations is determined by their importance for the solution of the scientific and technical problems facing the Svema Production Association and these problems can be solved both in 1 year and over a longer period. In the first case almost all the mentioned operations are equal in the volumes of financing or surpass the cost of operations performed on the basis of other contracts during 3 to 4 years.

Table 1. Volume of Expenditures on the Realization of Economic Contractual Scientific and Technical Relations of the Shostka Svema Production Association in 1973-1980

(in % of total)

Volume of expenditures per economic contract (thousand rubles)	Groups of relations I	II	III	Frequency of average expenditures (according to level)
Up to 10	17.5	7.8	49.5	16.5
11-20	22.5	31.4	17.0	24.0
Over 21	60.0	60.8	33.5	59.5

Table 2. Length of Realization of Economic Contractual Scientific and Technical Relations of the Shostka Svema Production Association in 1973-1980

(in % of total)

Length of fulfillment (years)	Groups of relations I	II	III	Frequency of average periods (according to level)
Up to 1	56.2	35.3	67.8	50.1
Up to 2	29.1	39.3	20.5	29.8
3 and more	14.7	25.4	11.7	20.1

As an analysis has shown, according to contracts belonging to group I scientific organizations solve more than 50 percent of the scientific and technical problems newly facing the Svema Production Association during the period of completion of work on the reconstruction or retooling of its individual production sections, which is determined by the long-term plans for the association's development. With regard to the contracts of group III about 70 percent of the operations envisaged by them last about 1 year. A longer time is not needed for the introduction of ready solutions and minor innovations.

The distribution of the number of scientific organizations, economic contracts and volumes of their financing over the examined groups of relations is characterized (see table 3) by a functional and spatial concentration and dispersion, which has also been observed with regard to other social and economic phenomena of fundamental importance.[2]

Table 3. Concentration and Dispersion of Economic Contractual Scientific and Technical Relations of the Shostka Svema Production Association in 1973-1980

(in % of total)

Groups of relations	Number of scientific research organizations	Number of economic contracts	Volume of their financing
I	10.5	62.5	67.3
II	23.6	20.0	19.1
III	65.9	17.5	13.6

The essence of the phenomenon of concentration and dispersion in the statistical structure of the economic contractual scientific and technical relations of an enterprise lies in the fact that a relatively small group of developers of innovations account for most of these relations and expenditures on their realization and, conversely, a comparatively negligible part is dispersed among a large number of scientific organizations--executors of economic contractual scientific research and experimental design operations.

The qualitative aspect of this phenomenon must be disclosed. The relations of group I are noted for the fact that they predetermine the constant functions of ensuring the scientific and technical development of production. A total of four scientific research organizations of the chemicophotographic sector and three scientific research organizations and one higher educational institution of other sectors and departments, whose operations have a direct effect on a rise in the technical and economic level of production, participate in the relations of this group. These relations mediate primarily the "vertical" (from the fundamental idea to application) transfer of pioneering innovations and their subsequent "horizontal" (from object to object) dissemination. Owing to the narrow specialization and limitation of the scientific potential of these organizations, studies not corresponding to their structure are performed on the basis of the relations of groups II and III.

The relations of group III are one-time relations and perform the function of a "horizontal" transfer from other fields of previously obtained scientific and technical innovations as applied to new production conditions and needs. Often the demand for these innovations arises unexpectedly and the periods of its satisfaction are short. Therefore, in this case the only way out lies in a decision on a rapid adoption (such a need rarely occurs again).

The importance of the relations of this group is determined by the expansion of the qualitative diversity and by the quantitative rise in the needs for innovations and in the demand for them as a result of the intensified effect of the economic mechanism on an improvement in the efficiency of production and in the quality of work in all the links of economic activity of an enterprise. This also explains the regularity of the significant dispersion of the relations of group III according to the structure, sectorial affiliation and organizational forms of the partners in industrial production called upon to satisfy such a broad functional-object diversity of its needs for scientific and technical support. The national economic role of the relations of this group in a fuller and broader utilization of the scientific potential is also big, in particular, if we take into consideration (according to the data of a one-time survey of the Ukrainian SSR Central Statistical Administration) that 78.5 percent of the introduced scientific investigations and studies begun more than 10 years ago and completed 2 years before the period under review were introduced only at one or two and only 0.6 percent at six enterprises and more.[3]

According to their functions the relations of group II are both of a "horizontal" and a "vertical" nature, that is, hold an intermediary position with regard to the relations of groups I and III. The demand for innovations realized according to the relations of group II is met after a preliminary applied study of a previously created scientific project and (or) adaptation of a

finished scientific and technical result to the new conditions of its application. In contrast to the relations of group III the functioning of the relations of this group is associated, as experience shows, with a big risk. The latter circumstance involved the appearance of the practice of formation of economic contractual relationships in the form of systematic stages representing a transition from simple to complex forms of scientific, technical and economic relations; for example, from an exchange of information on mutual interests and possibilities to an interaction on the basis of contracts for creative cooperation and then to actions on the basis of regular economic contracts for scientific research and experimental design operations. Such a stage-by-stage development of forms of scientific, technical and economic relations reduces the risk characteristic of an innovation, but often leads to a loss of the rate of mastering a novelty. The composition of the partners of an enterprise in such types of relations (as in the case of the relations of group III) is highly diverse in their structure, sectorial affiliation and organizational forms.

Thus, for the fullest possible satisfaction of the inevitably diverse and dynamic needs of its development an enterprise forms not only a permanent "nucleus," but two more groups of temporary relations functionally specialized and successfully supplementing each other in the quality and periods of innovations. An analysis of the territorial aspect (distance between cooperating partners) has shown that all the organizations having economic contracts with the Shostka Svema Production Association can be divided into three groups depending on the indicators of spatial concentration and dispersion characteristic of them, that is, the "nucleus," transitional group and periphery. In practice, all the partners in the relations of group I enter the "nucleus," that is, scientific research organizations located most closely to Svema, and the majority of the partners in the relations of group III, the peripheral zone. The partners in the relations of group II occupy an intermediary position and, accordingly, are in the transitional group. It has been established that scientific and technical cooperation is carried out by the Svema Production Association with scientific research organizations located at a distance of no more than 1,200 km.[4]

The presented analysis makes it possible to conclude that the closeness of the scientific relations of the Svema Production Association depends on various factors, but primarily on the degree of unity for the customer and executor of operations of the need for and the possibility of solving specific scientific and technical problems, on the availability of a sufficient scientific and technical potential for the executor and on the distance between partners.

The closest scientific relations of the Svema Production Association are established with the partners of the "nucleus" (it includes scientific research organizations in Moscow, Leningrad, Kiev, Kharkov and other big cities) and the weakest, with the partners from the peripheral zone.

In all probability this is typical for such a form of relations as in group III and is due to the fact that for executors removed from the customer the development and introduction of scientific and technical tasks small in volume (and sometimes in importance as well) are associated with considerable

material expenditures, with the need to obtain information and provide consultative and technical assistance during the performance of operations, which, naturally, is difficult when there is a big distance between cooperating parties, as well as with the unproductive, owing to the above-stated, utilization of the scientists and specialists of the executor organization. Furthermore, such a state of affairs is due to the lack of proper scientific relations and of full information on the scientific research conducted in organizations located in the peripheral zone and beyond its limits, as well as to the existence of a psychological barrier in the establishment of long-term scientific relations with little known partners, that is, to the unwillingness of the management of the Svema Production Association to increase the degree of risk in a successful performance of scientific research.

The examined facts of the functional and spatial concentration and dispersion of the economic contractual scientific and technical relations of an enterprise characterize one of the most important criteria in the integrity of such relations. Nonuniform in their relative significance, on the whole, they are regulated and determined in functional and spatial interrelationships. An analysis of the specific nature of the state and development of these relations makes it possible to assume that the maintenance of the necessary qualitative diversity of this integrity during the forthcoming two five-year plans will be accompanied by certain quantitative changes, as well as by a rise in the role of peripheral and transitional relations and a decline in the importance of the relations of the "nucleus."[5] Such an evaluation of existing tendencies reflects the objective need for an expansion of the interdisciplinary and intersectorial economic contractual scientific and technical relations of an enterprise as the necessary prerequisite for the further specialization and cooperation of scientific and technical activity under the effect of changes in the structure, forms and disposition of scientific and production potentials, as well as for a more successful accomplishment of the scientific and technical tasks facing the Svema Production Association on the basis of the latest achievements of science and technology.

The qualitative and quantitative changes in the significance of individual elements of the integral structure of the economic contractual relations of the analyzed enterprise necessitate an evaluation of the efficiency of scientific and technical relations according to their contribution to the solution of specific production problems. A nominal scale of levels of satisfaction of production with the studies performed for it can be utilized as one of the possible approaches to an evaluation of their efficiency from such positions. By means of such a scale on the basis of a sample of only 107 economic contracts for scientific research and experimental design operations performed for the Shostka Svema Production Association in 1973-1980 by 68 scientific research organizations the distribution of the corresponding levels, whose results are summarized in table 4, has been determined by the expert evaluation method.

On the basis of an additional analysis of factual data and of the expert evaluation (including information on the economic effect) of the basic characteristics of the examined relations three groups of criteria most significantly connected with the main success factors in the realization of these connections,

that is, the maximum degree of completion of scientific and technical operations and an efficiently selected type of group of relations and type of problems solved by an innovation, have been disclosed according to this scale. Owing to this the tendency toward a rise in the level of satisfaction of production with the results of economic contractual scientific research and experimental design operations through an increase in their structure of the share of the most completed operations performed according to the relations of group III is evaluated in a statistically significant manner. A number of other important criteria of relations (specialization of the developing scientific research organization, place of its location, initiative in the performance of operations and complexity and labor intensiveness in obtaining the results of scientific research and experimental design operations, as well as the volume of expenditures on them), from the point of view of the customer enterprise, are not connected significantly with changes in its evaluations of the level of satisfaction with its scientific and technical relations. In practice, consideration of this kind of one-sidedness of evaluations could ensure greater mutual understanding on the part of cooperating parties and a more substantiated approach to the formation of these relations.

Table 4. Expert Evaluation of Satisfaction of the Shostka Svema Production Association With Economic Contractual Scientific and Technical Relations of Groups II-III in 1973-1980

(in % of total)

Degree of satisfaction of the needs of the Svema Production Association with innovations on the basis of economic contracts for scientific research and experimental design operations (in terms of quality and periods)	Number of economic contracts
A. Needs for innovations could not be satisfied independently	33.8
B. Needs for innovations were satisfied better than this could have been done independently	31.2
C. Needs for innovations were satisfied in the same way as this could have been done independently	20.0
D. Needs for innovations were satisfied worse than this could have been done independently	5.0
E. Needs for innovations were satisfied neither according to the economic contract for scientific research and experimental design operations, nor independently	10.0

The realization of scientific and technical relations among the links of the single "science-technology-production" complex is connected with overcoming difficulties different in their causes and level of intensity. A qualitative analysis of the experience in the implementation of the real relations of production with the other links of the "science-technology-production" complex and a generalization of the experience described in the literature give reason to single out the following five basic categories of causes of these kinds of difficulties:

insufficient readiness of innovations for practical application, which, usually, is the consequence of incompletion of the scientific and technical study of the result transmitted for introduction into production;

insufficient economic interest in the practical application of an innovation (both on the part of the consumer organization and other links of the "production-science" complex);

insufficient readiness of the consumer for the application of an innovation, which is mostly due to a shortage of reserve capacities and to a low technological level of production;

shortcomings in the organization of the process of realization of innovations and their management, which are usually connected with the imperfect planning of scientific and technical progress, lack of departmental coordination of the participants in scientific and technical operations and poor development of object-program approaches to the implementation of innovations;

other causes of difficulties (category introduced for taking into consideration the specific nature of concrete relations of production with science).

The results of the expert evaluation (ranking) of the effect of various causes on the degree of difficulties encountered on the path of an efficient realization of "science-production" and "production-science" relations under conditions of the Shostka complex of organizations reflect several characteristic circumstances typical in their own way (see table 5).

Table 5. Ranking of Intensity of Difficulties in Realization of Economic Contractual Scientific and Technical Relations of the Shostka Svema Production Association in 1973-1980

Source of difficulties	Evaluations by experts of organizations*			On the whole
	Н	Т	П	
A. Insufficient readiness of innovations for application	3	1	1	1
B. Insufficient economic interest on the part of the consumer of an innovation	1	2	3	2
C. Insufficient managerial support for an innovation	2	3	4	3
D. Insufficient readiness of the consumer for the application of an innovation	5	5	5	5
E. Other possible causes	4	4	2	4

*Remark: Н--the Shostka Affiliate of NIIkhimfotoproyekt; Т--the special design and technological office of Khimfotoprom; П--the Shostka Svema Production Association.

As a rule, changes in the types of preferences by experts of all the three organizations of the Shostka complex coincide in the criterion, but greatly differ in the rank of intensity. For example, the acuteness of perception of difficulties (category A) in the representatives of production is much higher

than in the representatives of science and technology and, conversely, the imperfection of the incentive system (category B), as well as of organization, planning and management (category C), is felt relatively more acutely by the representatives of science and technology than by the representatives of production.

It is symptomatic that the representatives of production put the category of causes D in a place second in the acuteness of perception. Their meaningful discussion with experts pointed out the need to clearly distinguish during an expert examination the nature of the implemented scientific and technical innovation from the point of view of its novelty and scale of realization. The data of the expert evaluations made at the Svema Production Association reflect significant differences in the organizational and managerial situation characteristic of production and science relations: a) during the introduction of a single model and demonstration of the possibilities of application of an innovation; b) during the mastering of series production and a regular utilization of an innovation on a scale meeting the national economic need. An almost complete noncoincidence of the types of preferences by experts both in the rank and level of evaluations is observed in relation to these two cases.

The conclusion on the need for a differentiation of the approaches to an improvement in the organizational and economic forms of scientific and technical economic relations and the assignment of responsibility for the fate of specific scientific and technical innovations depending on the indicated differences in the content of the joint operations of science and production follows directly from this fact. Whereas in the first case the direct participation of the representatives of science in the realization of an innovation is one of the decisive factors, in the second case instances of centralized planning and management possessing the corresponding volume of rights have the decisive word. Thus, in our opinion, the answer to the traditional question "who should introduce scientific and technical innovations--the scientist, the production worker or the middleman-organizer?" can be as follows: "A system of state management of this type of activity reflecting the specific nature of these relations is needed."

FOOTNOTES

1. L. I. Brezhnev, "Leninskim kursom. Rechi i stat'i" /Following Lenin's Course. Speeches and Articles/, Vol 4, Moscow, Politizdat, 1975, p 218.

2. See L. S. Kozachkov, "Informatsionnyy analiz v upravlenii" /Information Analysis in Management/, Kiev, Tekhnika, 1977.

3. See V. Tarasovich and A. Tyzh, "Efficiency of Utilization of the Scientific Potential of the Ukrainian SSR," EKONOMIKA SOVETSKOY UKRAINY, No 1, 1978, p 63.

4. In 1973-1980 the country's four major scientific and technical centers, that is, Moscow, Leningrad, Kiev and Kharkov, accounted for 55 percent of the partners of the Svema Production Association. They fulfilled 35 percent of the total number of economic contracts.

5. On the basis of an analysis of the practical experience in the functioning of the economic contractual scientific and technical relations of the Svema Production Association in 1973-1980 the authors believe that the relative significance of these relations (that is, the proportion of the individual elements of their integral structure according to the number of economic contracts and the volume of expenditures on their realization) can be changed in the following way: for the relations of the "nucleus" (group I) noted for the greatest stability of absolute dimensions, toward a reduction from 70 to 50 percent and for peripheral relations (group III), toward a rise from 10 to 30 percent, while a 20-percent level remains comparatively unchanged for transitional relations (group II).

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PLAN FOR SCIENTIFIC, TECHNICAL PROGRESS IN TERNOPOL OBLAST DEVELOPED

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 3, Mar 83 pp 54-58

/Article by V. Vykhrushch, deputy chairman of the Ternopol Oblast Executive Committee, candidate of economic sciences: "Planning of Scientific and Technical Progress in a Region"/

/Text/ At present there is an urgent need for territorial management of scientific and technical progress. Under conditions of developed socialism intraregional economic relations among enterprises and organizations of various national economic sectors expand markedly, the possibility of a widespread intersectorial exchange of scientific and technical achievements appears and the need for an overall solution of scientific and technical problems determining a harmonious development of the industry, agriculture and production and social structure of every region increases.

The consideration of the "science-technology-production" cycle a single whole, general orientation of scientific and technical development toward the solution of social and economic problems, coordinated provision of all the cycle's stages with resources (material, financial and labor), system organization of planned management as applied to all periods and forms of development and realization of technical innovations and implementation of an efficient interaction of all the parts of the indicated complex are objective prerequisites for the development and intensification of the territorial aspect in the management of scientific and technical progress.

Scientific and technical development subordinate to the social and economic goals and tasks of society appears as the means of attaining them. Scientific and technical measures are directly aimed at meeting public needs for the creation of new use values, increase in production efficiency, facilitation of workers' labor, development of the creative functions of labor and environmental protection. All this greatly raises the role of local soviets of people's deputies in the territorial management of scientific and technical progress, whose powers are approved by article 147 of the USSR Constitution and by article 6 of the USSR Law "On Basic Powers of Kray and Oblast Soviets of People's Deputies and of Soviets of People's Deputies of Autonomous Oblasts and Autonomous Okrugs" and are reinforced by the decree of the CPSU Central Committee, the Presidium of the USSR Supreme Soviet and the USSR Council of Ministers (1981) "On the Further Increase in the Role of Soviets of People's Deputies in

Economic Construction." Local soviets of people's deputies take an active part in the preparation and realization of the plan for the economic and social development of a region, whose main section and starting point for the planning of the bulk of indicators is the plan for scientific and technical progress.

The accomplishment of important tasks of economic and social development in Ternopol Oblast during the 11th Five-Year Plan can be attained only on the basis of coordinated efforts of enterprises and organizations in a region irrespective of their departmental subordination. This, in turn, generates a need for intensifying the territorial management of scientific and technical progress and for lending it an overall nature, which, in the final analysis, will contribute to the attainment of a higher level of balance of planned assignments and their provision with resources.

We believe that the balance of the plan depends in large measure on an organic combination of sectorial and territorial planning. The former is aimed at finding optimal technical and economic solutions for the attainment by a sector of the maximum economic effect with minimal expenditures. Territorial, in contrast to sectorial, planning has primarily the territory of a certain level, not a sector, as its object. At the same time, a region is considered a production complex with specific conditions characterized by a certain provision with labor resources connected in terms of specialization, cooperation, combination and concentration of production, not a geographic concept or an administrative unit. This makes it possible to solve intersectorial problems common for a number of industrial and national economic sectors in a region and to more fully coordinate sectorial assignments with labor, financial, material and other resources in a specific region. Thus, the necessary prerequisites for an overall economic development of a region appear and objective conditions for the fulfillment of planned assignments in a full volume by all enterprises in a region and for a rise in the level of operation of lagging enterprises and whole sectors up to the level of advanced enterprises are created.

The development of the territorial management of scientific and technical progress makes it possible to significantly increase the organizing and controlling role of local party and Soviet bodies, to develop in the maximum possible way the initiative of labor collectives in matters of acceleration of scientific and technical progress and to widely popularize valuable undertakings and advanced experience at a region's enterprises and farms. This is of great importance for uncovering in the localities additional possibilities for the fulfillment and overfulfillment of planned indicators and for ensuring an efficient system of control on the part of local party and Soviet bodies and primary party organizations for the fulfillment of plans for the development of the national economy of regions, including in the field of scientific and technical progress.

The positive significance of the territorial management of scientific and technical progress can now be considered generally recognized. To this day, however, it has not been developed properly. Thus, to date, with small exceptions, in the structure of territorial planning bodies at an oblast level and

below there are no appropriate subdivisions, which would solve problems of an overall territorial planning of scientific and technical progress. Even the technical development of enterprises subordinate to executive committees of oblast soviets of people's deputies is organized exclusively according to the sectorial principle.

Practice has confirmed the need for the establishment of a single methodological base for the planning of scientific and technical progress in labor collectives and on their basis in cities, rayons and the oblast as a whole. The scientific and methodological recommendations developed at the Institute of Economics of Industry of the Ukrainian SSR Academy of Sciences, which set forth the organizational principles of formation of systems of territorial management in the oblasts of the Ukrainian SSR, are good aids in the solution of these problems.

In accordance with the directives of the Ukrainian SSR State Planning Committee, of oblast party and Soviet bodies and of the above-mentioned scientific and methodological recommendations Ternopol Oblast determined the basic directions in the solution of the problem of combination of sectorial and territorial management of scientific and technical progress on the basis of coordination of scientific research in a region, elaboration of plans for scientific and technical progress as the most important section in an overall plan for the economic and social development of the oblast and elaboration of overall object programs for the solution of the most important social-economic and scientific and technical problems.

The Ternopol Oblast Scientific-Coordinating Council for Scientific and Technical Progress jointly with the scientific-coordinating council of the Western Scientific Center of the Ukrainian SSR Academy of Sciences in Ternopol Oblast and with oblast councils of the scientific and technical society and of the Znaniye Society elaborated and coordinated with the oblast committee of the Communist Party of the Ukraine "An Overall Plan for the Development of Scientific Research and Assistance for Scientific and Technical Progress in Ternopol Oblast for the 11th Five-Year Plan," in which the list and basic content of measures for scientific and technical progress is presented and executors, time of execution and forms of organizational support are indicated. The overall plan consists of five basic sections: fundamental research (by branches of science); overall scientific and scientific and technical programs; applied scientific and scientific and technical developments; improvement in the training of scientific and pedagogical personnel; participation of scientists in patronage work and in the popularization of scientific and political knowledge.

Tasks of ensuring an efficient utilization of the scientific potential, mobilizing collectives of scientists for the study of the needs of production and their reflection in scientific research, accelerating the introduction of the results obtained into practice and more widely utilizing the intersectorial exchange of the achievements of science, technology and advanced techniques have been set for scientific organizations in Ternopol Oblast.

Ternopol Oblast has developed and successfully applied for a number of years its own methodological recommendations for the preparation of interconnected plans for the economic and social development of labor collectives, as well as of rayons, cities and settlements, whose characteristics are the following: organic interconnection of the plans of production units with the plans of regions, which enables sectorial and territorial management bodies to jointly affect the process of social and economic development; general method of planning at all the levels of the regional hierarchy, which makes it possible to amalgamate the plans of individual production units into a single plan for the economic and social development of a region; optimality of plans and their provision with appropriate labor, material and financial resources; coordination of plan indicators in superior organizations, corresponding ministries and departments and the republic's State Planning Committee; enlistment of a large number of specialists full of initiative, which has made it possible to ensure an overall approach to the substantiation and solution of the most important problems.

The elaboration of proposals for scientific and technical progress in the plan for the social and economic development of a region was preceded by the elaboration of measures by economic sectors: development and introduction into production of new articles and materials and of new industrial processes; rise in the level of mechanization and automation of production and labor; elimination of heavy manual work, especially in auxiliary industries with due regard for domestic and foreign achievements; development and introduction of automated control systems in a region as a whole, associations, enterprises, urban facilities and scientific research institutions; production specialization and rise in the level of standardization; renovation of fixed capital and modernization of existing equipment and so forth.

The planned measures connected with the plan for mastering new and improving the quality of manufactured products was preceded by an all-around analysis of the requirements for the quality of output, as well as of the tendencies in the change in these requirements. The shortcomings in output disclosed in the process of operation, as well as under laboratory and production conditions, data on claims and rejects, results of checks on the correspondence of the articles turned out to the established standards and of their comparison with the best domestic and foreign models and an evaluation of the level of quality of output were analyzed in an especially careful way. When the quality of output was planned, the characteristics of a given enterprise and sector and the state of work on the control of the quality of output at supplier enterprises were taken into consideration.

The experience in social and economic planning in Ternopol Oblast indicates that the availability of plans for the economic and social development of labor collectives and a region established on a single methodological basis and provided with labor, material and financial resources makes it possible to more efficiently control interconnected economic and social processes. The oblast committee of the Communist Party of the Ukraine and the oblast executive committee and planning bodies of Ternopol Oblast try to most fully utilize the vast capabilities inherent in a widespread application of the overall object method of planning, which makes it possible to most efficiently overcome the lack of coordination of actions of various departments, to more fully take into consideration and to better combine territorial and sectorial interests and to more rapidly solve current and long-term problems.

The overall program "scientific and technical progress" developed for 20 years serves as the basis for the solution of problems connected with the development of Ternopol Oblast. An overall forecast of the development of the oblast's national economy and of its most important links was formed within the framework of this program. It makes it possible to disclose the most significant bottlenecks, for the elimination of which it is necessary to establish and realize overall object programs. Therefore, the oblast council for social and economic planning on the basis of a more detailed and in-depth familiarization with such problems substantiates the need for the establishment and fulfillment of programs for the most important of them. The overall object program "scientific and technical progress" is the leading one among the overall object programs developed in the oblast. This is not accidental, because the acceleration of scientific and technical progress is the foundation on which the economic and social development of a region, production intensification and improvement in the efficiency and quality of work of labor collectives are based. The program "scientific and technical progress" is a multiobject program, because it encompasses the basic scientific and technical problems of the oblast's national economic development. The overall nature of the program is ensured by the fact that, first, it includes problems concerning almost all economic sectors and, second, for basic problems it envisages a full cycle of support operations, that is, from the performance of scientific research to the practical realization of its results. It is an integral part of the process of management of scientific and technical progress in a region. The program's structure corresponds to the basic stages in the "science-production" cycle. It reflects the development of the scientific and technical potential, its effect on the oblast's industrial potential and, as a consequence, the specific results of effect of the outlined operations on the accomplishment of basic social and economic tasks of regional development.

The range of technical problems requiring a scientific elaboration (up to 1990) is determined in the overall object program "scientific and technical progress." A total of 26 problems are singled out, among which the following problems are the most important: development and investigation of advanced industrial processes and automation equipment in instrument making and machine building; production of new substances on the basis of production waste and investigation of their properties and of the possibility of their application; investigation of the technology of manufacture of shaped billets by the method of electroslag casting; development of efficient methods of long-term storage of sugar beets without significant changes in the quality indices of raw materials for the purpose of minimizing losses; efficient utilization of the pool of equipment of kolkhozes and sovkhozes and other problems. A total of 44,500 measures for scientific and technical progress are to be introduced into the oblast's national economy during the years of the 11th Five-Year Plan. The expenditures on their introduction will total more than 190 million rubles, which is almost 40 percent more than during the 10th Five-Year Plan. In the oblast's industry alone plans are made to put into operation 13,500 units of new equipment, 101 flow lines, 179 mechanized and 70 automated sections and 20 fully mechanized shops. The annual economic effect from the introduction of measures for scientific and technical progress will exceed 90 million rubles during the 11th Five-Year Plan.

The overall object program for scientific and technical progress greatly increases the requirements for the quality of output. The funds allocated in the program for an improvement in the quality of output and for the mastering of new types of articles exceed the similar indicator of the preceding five-year plan by 80 percent. Plans have been made to master the production of 89 new types of products, to modernize 330 and to remove 355 obsolete types of articles from production. By the end of the 11th Five-Year Plan more than 1,000 types of products worth 1.85 billion rubles will be manufactured with the state Badge of Quality. The program envisages a significant volume of nature protection operations. In particular, the construction of cleaning installations is planned, which will make it possible by the end of the 11th Five-Year Plan to lower the proportion of discharge of polluted water to 5 percent and to solve the problem of complete water purification during the 12th Five-Year Plan. Dust collectors of a capacity of 371,000 cubic meters per hour and gas purifying installations of a capacity of more than 350,000 cubic meters per hour are to be put into operation.

A plan of key measures for the introduction into the oblast's national economy of the achievements of scientific and technical progress and for the strengthening of the relations of science with production with a specific indication of the customer, executor, place of introduction and assumed economic effect in the light of the decisions of the 26th CPSU Congress and the basic principles of V. V. Shcherbitskiy's report at the republic party and economic aktiv on 15 April 1982 was drawn up as a supplement to the overall object program for scientific and technical progress. For example, the development in the Ternopol Affiliate of the Lvov Polytechnical Institute of a highly productive automatic machine for the assembly of internal links of driving chains with the orientation of bushings along the seam will give an economic effect of 461,000 rubles. The development and mastering by the Vatra Production Association of searchlight equipment for open-cut mining more efficient in operation will lower its production cost by 30 to 40 percent. The introduction of 1,100 highly productive pneumatic looms at the cotton plant will give an economic effect of 895,000 rubles. The use of waste-free technology at the enterprises of the production association of the meat industry will make it possible to save no less than 800,000 rubles.

As a result of scientific, technical and organizational measures during the 11th Five-Year Plan the proportion of those engaged in heavy manual labor will be lowered significantly, 32,500 work places will be mechanized and automated and the saving of fuel, power and other material resources worth more than 10 million rubles will be ensured. A total of 15,000 tons of conventional fuel, 70,000 Gcal of thermal energy, 20 million kWh of electric power, 1,500 tons of rolled ferrous metal products, 2,000 tons of cement and 2,000 cubic meters of timber are to be saved annually.

The propaganda and introduction at the region's enterprises of an overall system for an increase in the national economic effect from the output and operation of products of the Ternopol Vatra Association approved by the Central Committee of the Communist Party of the Ukraine has a significant effect on the management of scientific and technical progress in the oblast. The system represents a complex of management of the entire activity of this association, which maintains at all the horizons of management and stages of the life cycle of products the necessary level of functioning of all elements and

ensures the efficiency of attainment of final results. The overall system for an increase in the national economic effect from output reflects nearly all state and sectorial systems for the control of improvement in the efficiency and quality of output at the stage of its manufacture, as well as those developed at the country's advanced enterprises and approved by the Central Committee of the CPSU. Owing to their creative development and unification into a single scheme of organization of production and management, new forms of ensuring the national economic effect at the stage of production preparation have been found. They rule out the application of transitional technology, guarantee the prescribed quality and greatly shorten the period from development until satisfaction of national economic needs for this output. They make it possible to attain the biggest national economic effect at the stage of production of articles and their operation.

The overall system for an increase in the national economic effect from output includes the following: a system for the management of scientific and technical progress, a system for the control of the quality of output and a complex of systems ensuring the functioning of the system for the management of scientific and technical progress and of the system for the control of the quality of output at all the stages of an article's life cycle.

Singling out systems for ensuring the functioning of the overall system for an increase in the national economic effect from output contributes to an efficient realization of functions and to the fullest coverage of objects of management. Thus, both ideological-political and social-psychological, along with economic, factors in an increase in the national economic effect are covered. The determination of requirements for informational, standard, economic planning and organizational-administrative support within the limits of the appropriate systems makes it possible to avoid the duplication of managerial work, maximally provides management bodies at all levels with the necessary data and creates the possibility of realizing the requirements for a single approach to management.

At the same time, the experience in the management of scientific and technical progress in Ternopol Oblast points to the existence of a number of problems, after whose solution, in our opinion, more favorable conditions for an efficient combination of sectorial and territorial principles of management would be created. For the purpose of solving these problems, it is necessary to implement the following measures:

To establish divisions for the territorial planning of scientific and technical progress in oblast planning commissions. The scientific research plans of scientific research and higher educational institutions located on the territory of a region should be included by directive order in the overall plan for economic and social development;

to develop unified methodological directives for the preparation of regional overall object programs, which would reflect the classification of programs according to the scale of accomplished tasks and the nature of raised problems and a single evaluation of the efficiency of program solutions. Program indicators should correspond to the system of indicators of state plans for economic and social development;

during the substantiation of program solutions to utilize the principles and methods of national economic planning set forth in the Methodological Directives of the USSR State Planning Committee for the Development of State Plans for the Economic and Social Development of the USSR;

to establish in a directive manner a single procedure of coordination of program goals in territorial and sectorial aspects;

to prepare the overall object program for scientific and technical progress for a period of no less than two five-year plans (or for the entire period necessary for the realization of the set goal) and to consider it the basic preplan document. It should reflect the set of measures for environmental protection, an efficient utilization of natural resources and a full utilization of production waste;

in all enterprises, organizations, kolkhozes and sovkhozes in a region to determine the optimal need for new equipment and, taking into consideration existing financial resources and technical capabilities, to establish the order and time of meeting it;

to study the need of regions for economic engineering personnel. To improve the system of instruction of program-object methods of planning in higher educational institutions. In our opinion, it is advisable in the very near future to revise the work of economic higher educational institutions and faculties so that they may train more economic engineers.

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SCIENTIFIC RESEARCH IN TAJIK SSR DISCUSSED

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 12 Mar 83 p 3

[Article by O. Sobolev, Tajik Telegraph Agency correspondent: "Science for the Five-Year Plan: Annual General Meeting of the Tajik SSR Academy of Sciences"]

[Text] The basic requirement currently posed to scientists by the party is that the role of science in the country's technological-economic and social development should be enhanced. At the November (1982) CPSU Central Committee Plenum comrade Yu. V. Andropov, General Secretry of the CPSU Central Commitee, identified specific tasks for accelerating scientific and technical progress. Namely, that efforts of the basic and applied sciences be maximally focused on implementing these tasks, the effectiveness of scientific research should be improved, and practical applications of that research in all branches of the national economy as well as for protecting the health of the Soviet people should be promoted in all ways. Precisely these are the positions from which the participants in the annual general meeting of Tajikistan's Academy of Sciences analyzed their performance in 1982 and the tasks for 1983.

Kh. M. Saidmuradov, main scientific secretary of the presidium of the republic's Academy of Sciences, dwelled in his speech on specific accomplishments of the Academy's institutions. He noted that last year research work was done on 75 projects specified by the State Plan for the Economic and Social Development of the Tajik SSR plus 159 topics of the administrative plan. In addition, tasks of 14 Union and six republic scientific-technical programs were fulfilled.

A contribution to basic research was made by mathematicians, who successfully continued researches into basic and applied problems. Physicists obtained new data in the fields of optics, synthesis of new crystals and other precious materials and alloys, and nuclear physics. Astrophysicists penetrated more deeply the mysteries of comets and meteors. New properties of various materials and compounds were discovered by chemists who synthesized substances that will find application in new industrial technologies.

Earth sciences were successfully developed. In particular, promising geological formations containing many useful minerals were detected and studied.

Research of importance not only to Tajikistan but also other seismically active regions was conducted by scientists from the Institute of Earthquake-Proof Construction and Seismology. They studied earthquake-cluster phenomena and concluded that their current prediction should be based on a complex whole of

natural warning signs and the combined effort of many seismic centers. Findings of studies of excited seismicity in the neighborhood of large impounding water reservoirs were assessed and, on this basis, permissible rates of intake and discharge of water determined.

Biologists have been working in cooperation with experts-practitioners to enhance the effectiveness of agricultural production. New research projects have been undertaken in addition to projects continued from previous years. As a result, two lines of cotton with a higher yield of medium-length fiber and higher oil content of seeds were developed.

One of the synthesized preparations (retardant C_1) accelerates the ripening of cotton bolls by 10-12 days and enhances yields by 13-14 percent. Work to introduce this crop at various elevations on mountains and other work has been continued.

The arsenal of means and methods of the diagnosis and treatment of diseases of the human liver and digestive organs has been expanded by scientists at the Institute of Gastroenterology. They recommended a local medicinal substance suitable for processing into main ingredients of Sinolone--an analogue of expensive imported drugs.

A large group of social scientists achieved notable accomplishments in the comprehensive study of the republic's productive forces and the drafting of a preliminary variant of a comprehensive program for scientific and technical progress as well as of schemas for the formation and development of the YuTPPK [expansion unknown] and other fields of social and cultural construction.

The speaker paid principal attention to aspects of intensifying production on the basis of a more rapid development of science and broad practical application of its achievements. Definite work in this direction has been acomplished in close cooperation with ministries and departments. During the year reported on, 29 projects found application in production, including 10 projects relating to the implementation of the Food Program. The overall volume of contractual consulting services was 2.5 million rubles. The savings produced to the national economy by the research projects and scientific proposals and recommendations reached 10 million rubles.

The greatest effects in utilizing scientific research were produced by the Institute of Earthquake-Proof Construction and Seismology.

The principal successfully applied research projects include an integrated system for cotton-pest control. Its application on 10,000 hectares of farms of the Shaartuzskiy, Dzhilikul'skiy and Kumsangirskiy rayons was done with the assistance of scientists from the Institute of Zoology and Parasitology imeni Ye. N. Pavlovskiy. The Institute of Plant Physiology and Biophysics and the Department of General Genetics of Cotton at Sovkhozes No 2 and No 4 of Yavanskiy Rayon introduced a system for the year-round utilization of cotton-growing land.

The Department of General Genetics of Cotton has jointly, with the Tajik Scientific Research Institute of Farming under the Ministry of Agriculture, developed and introduced on a number of farms, over an area of more than 19,000 hectares, a method for chemical pinching out of cotton with the aid of the TUR

preparation. This accelerates by 4-5 days the ripening of the bolls and increases yields by 10-15 percent.

These and other examples demonstrate that considerable potential exists for utilizing research projects, the speaker stressed. But that utilization is far from adequate.

The Food Program poses special requirement to scientists. Its implementation requires the united effort of academic, administrative and higher-school research centers.

Inter-republic research bonds have been further expanded. Under the agreement for creative cooperation of the Tajik SSR and Belorussian SSR academies of sciences, joint research has been conducted in physics, chemistry, biology, philosophy and other sciences. Scientific research institutions of Tajikistan and Uzbekistan also have commenced joint research. On the whole the institutions of the Tajik SSR Academy of Sciences have successfully cooperated with 60 leading scientific centers in this country on principal research problems.

The Academy's scientific institutions have been doing fruitful research uder bi- and multi-lateral cooperation agreements with research centers of Bulgaria, Czechoslovakia, the GDR, Poland, Cuba and Afghanistan, and also of the United States, France, India and others.

The extremely unsatisfactory state of the capital construction of the Academy's facilities was pointed out; this seriously affects the performance of the research institutions.

At the meeting reports were presented by Academicians-secretaries of the following divisions of the Academy: Physico-Mathematical, Chemical and Geological Sciences, Biological Sciences, and Social Sciences. They summarized the results of the considerable work accomplished by the institutes and departments of these divisions last year. The speakers offered proposals for enhancing the effectiveness of research and eliminating shortcomings.

Academician A. A. Adkhamov described the progress made in implementing the targeted comprehensive program for solar engineering and pointed to the shortage of funds and resources at the Academy's SKTB [Special Design and Technological Office] and RSU [Repair and Construction Administration] enterprises. This shortage is hampering many activities. The speaker stressed the great importance of broadening creative contacts with the production staffs of the collectives of physico-technical, chemical and other institutes.

The need to accelerate the pace of the conduct of applied research based on basic research in the biological sciences was pointed out by Academician M. N. Narzikulov. He was concerned because completed research projects are not introduced everywhere on the necessary scale. Sometimes this is the fault of "lack of contacts" between scientists and practitioners, their insufficient responsibility, which should be mutual. For example, zoologists have developed an excellent method for the integrated protection of fruit crops against pests. But this method has been applied only on isolated farms, although the Tadzhiksel'khozkhimiya Tajik Association for Agricultural Chemicals could already now take steps to introduce it in all orchards of the republic.

Academician S. A. Radzhabov said: "The concentration of the research effort of social scientists on developing topical problems of philosophy, history, economics, Orientalism and language and literature enabled them to achieve major accomplishments. During the year of the 60th anniversary of establishment of the USSR they labored especially fruitfully and strengthened their bonds with the practice of communist construction. Scientists take a most direct part in the internationalist and patriotic upbringing of working people. Attention is being paid to elevating the ideological-theory level of the works of the republic's social scientists."

T. N. Nazarov, rector of the Tashkent State University imeni V. I. Lenin and Corresponding Member of Tajikistan's Academy of Sciences, spoke about the enhanced research potential of higher schools and the need to utilize it more fully in joint research with academic subdivisions. In addition, he declared, there is a need for mutual interest of scientific institutions, ministries and departments in bringing the recommendations of scientists to a successful practical conclusion. Their mutual contacts should be based on long-term agreements.

Using the Institute of Astrophysics as an example, Academician P. B. Babadzhanov demonstrated how the effectiveness and quality of research get improved by the use of automatic devices and computers. Much has been accomplished at that institute, but new improved means and techniques of observation are needed to carry out the subsequent programs for studies of comets, meteors, asteroids and the upper atmospheric layers.

Important questions relating to the further expansion of research into history, philosophy and Orientalism were raised by Academician B. I. Iskandarov, Tajik SSR Academy of Sciences, and I. S. Braginskiy, Corresponding Member of the Tajik SSR ACademy of Sciences.

The inexhaustible potential of synthetic selection and genetic engineering for the development of productively ideal varieties and species of plants and animals was discussed by Academician Yu. S. Nasyrov, Tajik SSR Academy of Sciences. Intensive development of this fundamental research in the republic requires certain unique equipment and facilities serving to broaden the range of experiments and attain concrete results. The development of bio-engineering in this republic and the training of personnel for this new discipline have to be seriously considered.

Mathematicians follow two paths as it were: research into problems of theory and the development of applied problems. The theoreticians have the right to be gratified with their achievements. On the other hand, little has been done for practice, for the national economy, Academician Z. D. Usmanov declared. Production should be elevated to the level of modern science, the interest of practitioners should be expanded and their horizon widened, and work discipline tightened.

The Institute of Earthquake-Proof Construction and Seismology has become one of the country's largest regional centers of its kind. Its collective has grown in quality and numbers and begun to solve the most important problems of the national economy. It is receiving considerable support from the USSR Academy of Science. In this connection, S. Kh. Negmatullayev, Corresponding Member of the Tajik SSR Academy of Sciences, drew the attention of the Academy's Presidium to the need to expedite the construction of new facilities at the institute.

The concluding address was delivered by M. S. Asimov, President of Tajikistan's Academy of Sciences, who dwelled on the principal tasks of scientists relating to the implementation of the Food Program, the planning and coordination of scientific research and the utilization of the achievements of science in the national economy.

The general meeting approved the report on the scientific and scientific-organizational activities of Tajikistan's Academy of Sciences in 1982 and accepted for implementation the 1983 plans for research into natural and social sciences.

The participants in the meeting listened to the announcement by P. M. Solozhenkin, Vice President of Tajikistan's Academy of Sciences, about the projects of young scientists and higher-school students that were awarded certificates and prizes of the Tajik SSR Academy of Sciences. The certificates and prizes were distributed by M. S. Asimov.

The general meeting also discussed an organizational matter. It approved the directors of the Academy's scientific research institutes who had been elected for the new term of office by the general meetings of the Academy's divisions.

Those taking part in the meeting's deliberations included the Deputy Chairmen of the Tajik SSR Council of Ministers A. N. Maksumov and R. Yu. Yusufbekov and the head of the Department of Science and Educational Institutions at the Tajik CP Central Committee, A. R. Rashidov.

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LENIN AND USSR STATE PRIZE CONTEST PROJECTS IN SCIENCE AND TECHNOLOGY NAMED

Moscow IZVESTIYA in Russian 13 May 83 p 3

[Text] The Committee for Lenin and USSR State Prizes in Science and Technology under the USSR Council of Ministers announced that the following projects are eligible for the 1983 USSR State Prize Contest:

1. Akimov, Yu. K., Vorob'yev, A. A. Zolin, L. S., Kopylov-Sviridov, V. A., Kuznetsov, A. A., Morozov, B. A., Mukhin, S. V., Nikitin, V. A., Pilipenko, Yu. K., Feynberg, Ye. L., Tsarev, V. A., and Shifranova, M. G., "High-Energy Proton Diffraction Scattering." (Series of studies.)

Submitted by the United Institute of Nuclear Research.

2. Aleksandrov, P. A., Aristov, V. V., Afanas'yev, A. M., Denisov, A. G., Zakharov, B. G., Imamov, R. M., Koval'chuk, M. V., Kon, V. G., Lobanovich, E. F., Pronina, L. N., Shekhtman, V. Sh., and Shilin, Yu. N., "Development of a Complex of Methods for Crystal Structure Analysis."

Submitted by the Institute of Solid State Physics, USSR Academy of Sciences.

3. Alferov, Zh. I., Bogatov, A. P., Vasil'yev, M. G., Gorelenok, A. T., Dolginov, L. M., Druzhinina, L. V., Durayev, V. P., Yeliseyev, P. G., Konnikov, S. G., Mil'vidskiy, M. G., Sverdlov, B. N., and Shevchenko, Ye. G., "Isoperiodic Heterostructures of Multi-Component (Quaternary) Solid Solutions of A^3B^5 Semiconductor Compounds." (Series of studies.)

Submitted by the Physics Institute imeni P. N. Lebedev, USSR Academy of Sciences, and the Physicotechnical Institute imeni A. F. Ioffe, USSR Academy of Sciences.

4. Amirkhanov, Kh. I., Alibekov, B. G., Vikhrov, D. I., Mirskaya, V. A., Mursalov, B. A., Polikhronidi, N. G., and Stepanov, G. V., "Isochoric Specific Heat and Other Calorific Properties of Technically Important Liquids and Their Vapors and Gases Over a Broad Range of Parameters of State." (Cycle of studies.)

Submitted by the Institute of Physics, Dagestan Affiliate of the USSR Academy of Sciences.

5. Andreyev, V. N., Borovlev, S. P., Vodennikov, B. D., Danilov, M. M., Danilyan, G. V., Dronyayev, V. P., Yermakov, O. N., Nedopekin, V. G., Novitskiy, V. V., Pavlov, V. S. and Rogov, V. I., "Discovery and Investigation of Spatially Odd Emission Asymmetry of Fragments and Neutrons Durig the Fission of Heavy Nuclei by Polarized Thermal Neutrons." (Cycle of studies.)

Submitted by the Institute of Theoretical and Experimental Physics.

6. Belov, K. P., Galkina. O. S., Dzyaloshinskiy, I. Ye., Zvezdin, A. K., Irkhin, Yu. P., Kadomtseva, A. M., Kondorskiy, Ye. I., Levitin, R. Z., Nagayev, E. L., Nikitin, S. A., Samokhvalov, A. A., and Sokolov, V. I., "Magnetism and Electron Structure of Rare-Earth Metals and Compounds." (Cycle of studies.)

Submitted by the Physics Department of Moscow State University imeni M. V. Lomonosov.

7. Bel'dyugin, I. M., Bespalov, V. I., Zel'dovich, B. Ya., Zubarev, I. G., Kochemasov, G. G., Nosach, O. Yu., Pasmanik, G. A., Ragul'skiy, V. V., Sidorovich, V. G., Sukharev, S. A. and Fayzullov, F. S., "Self-Rotation of the Wavefront of Light under Forced Hypersonic Scattering." (Cycle of studies.)

Submitted by the Physics Institute imeni P. N. Lebedev, USSR Academy of Sciences, and the Institute of Applied Physics, USSR Academy of Sciences.

8. Bokut', B. V, Volosov, V. D., Dmitriyev, V. G., Kovrigin, A. I., Kulevskiy, L. A., Piskarskas, A.-P. S., Rez, I. S., Rustanov, S. R., Serebryakov, V. A., Strizhevskiy, V. L., Sukhorukov, A. P. and Freydman, G. I., "Development of the Physical Principles of High-Efficiency Conversion of Laser Emission Frequency in Nonlinear Crystals and the Development on That Basis of Coherent Emission Sources Adjustable Within the Ultraviolet, Visible and Infrared Ranges." (Cycle of studies.)

Submitted by the Physics Department of Moscow State University imeni M. V. Lomonosov.

9. Klyshko, D. N., Penin, A. N., and Fadeyev, V. V., "Discovery and Investigation of the Parametric Light Scattering Phenomenon and Its Application to Spectroscopy and Meteorology." (Cycle of studies.)

Submitted by the Physics Department of Moscow State University imeni M. V. Lomonosov.

10. Leypunskiy, O. I., "Theory of Diamond Synthesis in the Thermodynamic Stability Range of Diamonds."

Submitted by the Institute of Chemical Physics, USSR Academy of Sciences.

11. Bogolyubov, N. N., and Sadovnikov, B. I., "Mathematical Methods of Statistical Mechanics." (Cycle of studies.)

Submitted by the Mathematics Institute imeni V. A. Steklov, USSR Academy of Sciences.

12. Lavrent'yev, M. M., Anikonov, Yu. Ye., Romanov, V. G., and Shishatskiy, S. P., "Converse and Incorrect Problems of Mathematical Physics and Analysis." (Cycle of studies.)

Submitted by the Computer Center of the Siberian Affiliate of the USSR Academy of Sciences.

13. Vaulina, A. Z., Zotov, A. V., Korneyev, V. Ye., Okulov, A. D., Okhotnikova, N. A., Popil'skiy, M. Ya., Reshetnikov, B. S., Ryabin, V. A., Sekirazh, V. M., Sereda, B. P., Sorokin, G. A., and Tikhonov, N. Z., "Establishment and Development of Large-Scale Production of Chromium-Containing Products Based on the Development and Application of Advanced Production Techniques."

Submitted by the All-Union Association of the Soda Industry and the Ural Scientific Reearch Chemical Institute with Pilot Plant.

14. Delimarskiy, Yu. K., Gorodyskiy, A. V., Zarubitskiy, O. G., Fishman, I. R., Brovin, I. P., and Aleksanyants, I. V., "Development of Principles of the Theory and Technology of the Ion-Melt Electrochemical Cleaning of Metals." (Cycle of studies.)

Submitted by the Institute of Problems of Materials Science, Ukrainian SSR Academy of Sciences.

15. Mikhaylov, Yu. A., Sukhodrev, N. K., Fedotov, S. I., Shikanov, A. S., Vompe, A. F., Zhivilova, M. G., Krestovnikova, T. I., Uvarova, N. V. Kheynman, A. S., Shapiro, B. I., and Shpol'skiy, M. R., "Development and Applications of Photographic Materials for Astronomy, Spectroscopy and Thermonuclear Laser Plasma Diagnostics."

Submitted by the Physics Institute im. P. N. Lebedev, USSR Academy of Sciences, and the Crimean Astrohysical Observatory, USSR Academy of Sciences.

16. Myasoyedov, N. F., Tupitsyn, I. F., Kaminskiy, Yu. L., Lavrov, O. V., Mihaylov, K. S., Sidorov, G. V., Shevchenko, V. P., Grebenik, A. M., Mishin, V. I., Prokof'yeva, G. P., Rumyantseva, L. N., and Popova, G. L., "Development and Introduction of the Production of Tritium-Tagged Compounds for Physico-Chemical Biology and Biotechnology." (Cycle of studies.)

Submitted by the Institute of Molecular Genetics, USSR Academy of Sciences.

17. Ataniyazov, R., Belen'kiy, F. G., Gavrilov, Yu. A., Davydov, A. N., Kolatov, D. A., Mirzakhanov, M. K. o., Nikolayev, A. A., Smirnov, R. S., Suyunov, N. T., Khodzhakuliyev, Ya. A., Chavushyan, R. Ye., and Shumskiy, V. V., "Discovery and Accelerated and Highly Effective Exploration of the Unique Dauletabad-Donmez Condensate Gas Deposit in Turkmen SSR."

Submitted by the USSR Ministry of Geology.

18. Beus, A. A., Grigoryan, S. V., Yeremeyev, A. N., Kvyatkovskiy, Ye. M., Krasnikov, V. I., Ovchinnikov, L. N., Perel'man, A. I., Polikarpochkin, V. V., Safronov, N. I., Solovov, A. P., and Tauson, L. V., "Development of Scientific Principles and Introduction of Geochemical Methods of Exploration of Ore Deposits."

Submitted by the Institute of the Mineralogy, Geochemistry and Crystallochemistry of Rare Elements.

19. Kravtsov, A. I., Bakaldina, A. P., Yermekov, M. A., Tokareva, E. G., Zimakov, B. M., Lidin, G. D., Brizhanev, A. M., Yefremov, K. A., Tender, O. V., Dorosh-

kevich, N. V., Trofimov, L. A., and Yanovskaya, G. B., "Gazonosnost' ugol'nykh basseynov i mestorozhdeniy SSSR" [Gas Content in the Coal Basins and Deposits of the USSR]. (Monograph in 3 volumes, Nedra Press, Moscow, 1979-1980.)

Submitted by the Moscow Geological Exploration Institute imeni Sergo Ordzhonikidze.

20. Kuznetsov, V. A., Kuznetsov, Yu. A., Belousov, A. F., Distanov, E. G., Dymkin, A. M., Zolotukhin, V. V., Izokh, E. P., Obolenskiy, A. A., Polyakov, G. V., Sinyakov, V. I., and Sotnikov, V. I., "Magmatic and Endogenous Ore Formations in Siberia." (Cycle of studies.)

Submitted by the Institute of Geology and Geophysics, Siberian Affiliate of the USSR Academy of Sciences.

21. Peyve, A. V., Ivanov, S. N., Pushcharovskiy, Yu. M., Zonenshayn, L. P., Knipper, A. L., Markov, M. S., Mossakovskiy, A. A., Necheukhin, V.M., Perfil'yev, A. S., Til'man, S. M., Fedorovskiy, V. S., and Shtreys, N. A., "Patterns of Formation of Earth's Crust on Continents." (Cycle of Studies.)

Submitted by the Geological Institute, USSR Academy of Sciences.

22. Zhdanov, Yu. A., Borovich, I. I., Makarov, E. V., Gorstko, A. B., Bronfman, A. M., Volovik, S. P., Dombrovskiy, Yu. A., Surkov, F. A., and Aldakimova, A. Ya., "Simulation Model of the Ecosystem of the Sea of Azov as a Means of Systemic Analysis, Forecasting and Control of a Natural-Technical Complex."

Submitted by the North Kazakhstan Higher-School Research Center.

23. Georgiyev, G. P., Gvozdev, V. A., Golubovskiy, M. D., Il'in, Yu.V., Ryskov, A. P., Skryabin, K. G., Anan'yev, Ye. V., Bayev, A. A., Krayev, A. S., Kramerov, D. A., and Churikov, N. A., "Mobile Genes of Animals." (Cycle of studies.)

24. Grachev, M. A., Baram, G. I., Perel'proyzem, M. P., Livanov, V. A., Bolvanov, Yu. A., Kuz'min, S. V., Kuper, E. A., Kargal'tsev, V. V. Kiselev, Yu. M. Sandakhchiyev, L. S., and Safronov, O. N., "Development of the Microcolumn Liquid Chromatography Method, Development and Organization of the Production of Ob'-4 Microcolumn Liquid Chromatographs."

Submitted by the Novosibirsk Institute of Organic Chemistry, Siberian Affiliate of the USSR Academy of Sciences.

25. Danilova, M. F., Vasil'yev, A. Ye., Gamaley, Yu. V., Kozubov, G. M., and Miroslavov, Ye. A., "A Cycle of Studies of the Ultrastructure of Plant Tissues."

Submitted by the Botanical Institute imeni V. L. Komarov, USSR Academy of Sciences.

26. Ivanova-Kazas, O. M., "Comparative Embryology of Invertebrates." (Monograph in 6 volumes, Nauka Press, Moscow-Leningrad, 1975-1981.)

Submitted by the Leningrad State University imeni A. A. Zhdanov.

27. Kotyuk, P. G., Kryshtal', O. A., Magura, I. S., and Pidoplichko, V. I., "A Study of the Ion Mechanisms of Excitability of the Nerve Cell Soma." (Cycle of Studies.)

Submitted by the Institute of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, and the Institute of Bio-Organic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences.

28. Navashin, S. M., Kestner, A. I., Levitov, M. M., Matokhina, N. M., Mileshin, Yu. N., Nys, P. S., Savitskaya, Ye. M., Smirnova, S. S., Telegin, L. P., and Shvyadas, V.-Yu. K., "Development of the Scientific Principles and Technology and the Industrial Application of Biocatalytic Processes for the Synthesis of Principal Compounds for the Production of β-Lactamic Antibiotics."

Submitted by the All-Union Scientific Research Institute of Antibiotics.

29. Emanuel', N. M., Tarusov, B. N., Archakov, A. I., Burlakova, Ye. B., Vladimirov, Yu. A., Ivanov, I. I., Kagan, V. Ye., Kozlov, Yu. P., Kudryashov, Yu. B., Neyfakh, Ye. A., Pal'mina, N. P., and Roshchupkin, D. I., "Physico-Chemical Mechanisms of the Free-Radical Peroxidation of Lipids in Biological Membranes." (Cycle of studies.)

Submitted by Institute of Chemical Physics, USSR Academy of Sciences.

30. Vagner, G. K., "History of the Culture of Northeastern Rus. Twelfth to Fifteenth Centuries." (Cycle of studies.)

Submitted by Institute of Archeology, USSR Academy of Sciences.

31. Gryaznov, M. P., "Antiquities of Southern Siberia." (Cycle of studies.)

Submitted by Institute of Archeology, USSR Academy of Sciences.

32. Beloded, I. K., Palamarchuk, L. S., Rusanovskiy, V. M., Skripnik, L. G., Buryachok, A. A., Vinnik, V. A., Gnatyuk, G. M., Golovashchuk, S. I., Rodnina, L. A., Chertorizhskaya, T. K., and Yurchuk, L. A., "Slovar' ukrainskogo yazyka" [A Dictionary of the Ukrainian Language] in 11 volumes, Kiev, Naukova Dumka Press, 1970-1980.

33. Sokolov, G. M., Belyakov-Bodin, V. I., Voroshin, A. P., Gorskiy, L. K., Dudin, N. I., Novitskiy, A. M., Panfilov, A. B., and Savitskaya, A. B., "Development and Introduction of an Integrated System for Financing and Crediting Capital Construction."

Submitted by the USSR Stroybank and the Executive Committee of the Moscow City Soviet of People's Deputies.

34. Klibanov, A. I., "Cycle of Studies of the History of Religion and Russian Popular Free Thinking From the 14th to the 20th Centuries."

Submitted by the Institute of Scientific Atheism, Academy of Social Sciences under the CPSU Central Committee.

35. Oyzerman, T. I., Lapin, N. I., and Kuz'min, V. P., "Studies in the Formation and Development of the Philosophical Doctrine of K. Marx." (Cycle of studies.)

Submitted by the Institute of Philosophy, USSR Academy of Sciences, and the Publishing House of Political Literature under the CPSU Central Committee.

36. Anuchin, N. P., "Development of New Accounting and Norming Techniques for the Technological Estimation of Forest Resources and Principles of the Theory of Forestry Management." (Cycle of studies.)

Submitted by the Moscow Institute of Forestry Engineering.

37. Zaytsev, G. M., Viktorenkov, M. N., Galeyev, L. V., Ivanov, B. F., Krutikov, O. A., Larina, N. S., Filippov, I. Ye., Khrenov, L. S., Chikizov, P. I., Shandar', V. M., and Shtapenko, Ye. Ye., "Develoment and Introduction of the Technology of Production of High-Grade Seeds of the Coniferous Species on Specialized Areas for the Expanded Reproduction of Forest Resources."

Submitted by the USSR State Committee for Forestry.

38. Melekhov, I. S., "Cycle of Studies in Taiga Forestry Management."

Submitted by the Arkhangel'sk Institute of Forests and Silvichemistry.

39. Verkhoglazenko, N. M., Zimov, I. L., Kan, P. Kh., Klemyshev, Yu. I., Likhosherstov, G. V., Madzhidov, U. Kh., Mokhovikov, V. F., Palvanov, D. P., Razhobov, B., Sivokonev, P. A., Khakimov, M., and Tsutsman, N. M., "Developing an Industrial Technology for the Irrigation and Colonization of Central Asian Desert Lands."

Submitted by the USSR Ministry of Land Reclamation and Water Management.

40. Oleynikov V. D., Markov, V. Ye., Zenishchev, V. A., Grabel'kovskiy, N. I., Savrasov, B. A., Zhikharev, S. V., Morgunov, A. A., Polunin, Yu. P., Alekhin, I. T., Gozman, G. I., Rovnyy, G. A., and Aniskin, V. I., Development and Introduction of Machinery and Equipment for the Comprehensive Mechanization of Grain Processing at Kolkhozes and Sovkhozes."

Submitted by the Ministry of Tractor and Agricultural Machine Building.

41. Arabidze, G. G., Golikov, A. P., Kukharchuk, V. V., Mashkovskiy, M. D., Orlov, S. N., Postnov, Yu. V., Sidorenko, G. I., and Shkhvatsabaya, I. K., "Scientific Principles and Introduction Into Clinical Practice of a System for the Diagnosis and Treatment of Patients With Various Forms of Arterial Hypertension."

Submitted by the All-Union Cardiological Research Center of the USSR Academy of Medical Sciences.

42. Batanova, R. P., Vasil'yev, I. P., Ginters, R. R., Danetskiy, S. I., Kanep, V. V., Lautsis, U. V., Ozols, I. Zh., Promberg, Ya. B., Purvin'sh, A. Ya., Rubins, Ya. F., Samoylov, A. I., and Yura, Yu. N., "Application of Achievements of Science and Technology to the Design, Construction and Operation of Public

Health Facilities Serving to Markedly Improve the Quality of Medical Care of Patients and the Working Conditions of Medical Personnel in the Latvian SSR During the 1971-1981 Period."

Submitted by the LaSSR Ministry of Health and the LaSSR Ministry of Construction.

43. Borodin, Yu. I., Vyrenkov, Yu. Ye., Zerbino, D. D., Panchenkov, R. T., Sapin, M. R., Tsyb, A. F., and Yarema, I. V.,Basic Research Into Lymphology and Its Practical Clinical Applications."

Submitted by the Moscow Medical Stomatological Institute imeni N. A. Semashko.

44. Bochkov, N. P., Davidenkova, Ye. F., Zakharov, A. F., Pogosyants, Ye. Ye., and Prokof'yeva-Bel'govskaya, A. A., "Basic Research Into Normal and Pathological Human Chromosomes." (Cycle of studies.)

Submitted by the Institute of Medical Genetics, USSR Academy of Medical Sciences.

45. Kalamkarov, Kh. A., Nikitin, O. P., Doynikov, A. I., Sabitov, V. Kh., Akhmetzanov, G. Sh., Karal'nik, D. M., Glazov, O. D., Lobanov, I. F., Serova, G. A., Dorfman, L. M., Shteyngart, M. Z., and Sevost'yanov, D. G., "Development, Industrial Production and Practical Utilization of an Ensemble of Stomatological Materials, Instruments and Techniques for the Construction of Ceramic and Metal-Ceramic Prostheses."

Submitted by The Central Scientific Research Institute of Stomatology.

46. Tareyev, Ye. M., Serov, V. V., Vinogradova, O. M., Mukhin, N. A., Sura, V. V., Rukosuyev, V. S., and Shamov, I. A., "Basic Research Into the Problem of Amyloidosis."

Submitted by the First Moscow Medical Institute imeni I. M. Sechenov.

47. Anufriyev, V. A., Bezverkhiy, S. F., Kocherygin, I. I., Kutenev, V. F., Laptev, S. A., Negamatulin, N. N., Potapov, N. M., Sal'nikov, V. I., Subbotin, V. A., Tokarev, A. A., Estrin, V. M., and Yatsenko, N. N., "Development of an Ensemble of Special Testing Facilities at the Central Scientific Research Automobile Test Area; Development and Introduction of New Accelerated Test Technology Assuring Improvements in the Technical Level and Quality of Automotive Equipment."

Submitted by the Ministry of the Automotive Industry.

48. Bankovskiy, Yu. V., Boykov, K. G., Gurychev, S. Ye., Dzanashvili, G. F., Zykov, A. A., Kabaidze, V. P., Kostin, A. M., Maslovskiy, Yu. V., Polyakov, V. I., Taller, B. N., Firsov, K. Ya., and Chekalov, B. A., "Development and Industrial Introduction of Technological Ensembles of High-Efficiency Equipment for the Machining and Finishing of the Housing Elements of High-Precision Instrument Bearings."

Submitted by the Ministry of the Machine Tool and Tool Building Industry.

49. Bardyshev, V. F., Bobkov, V. I., Dragunov, S. N., Yerokhin, V. I., Yefremov, V. N., Makarov, N. I., Mozzhukhin, A. V., Orekhov, D. M., Pirogov, V. K., Razumov, I. M., Shal'nov, N. A., and Yablokov, N. G., "Development and Organization of the Series Production of High-Efficiency Mechanized OKP70 Ensembles and Their Introduction Under Complicated Mining-Geological Conditoins in Mines of the Kuznetsk, Karaganda, Pechora and Other Basins."

Submitted by the Ministry of Heavy and Transport Machine Building and the USSR Ministry of the Coal Industry.

50. Bogatov, N. A., Vol'per, Yu. D., Yermolyuk, Yu. N., Ivanov, V. N., Kolesnikov, V. I., Lesechko, V. A., Medvedev, A. N., Ovcharov, M. S., Slomik, A. K., and Skachko, Yu. N., "Develoment and Industrial Introduction of the Technology and Ensemble of Machinery for the Fabrication of Economical Petroleum and Gas Pipe With Diameters of Up To 530 mm for Important Applications."

Submitted by the "Elektrostal'tyazhmash" Production Association and the Vyksunskiy Metallurgical Plant.

51. Gorbunov, G. V., Bondarchik, V. V., Bortnitskiy, S. I., Galko, V. G., Zybov, M. V., Kudyanov, A. V., Linkevich, V. Ya., Raptunovich, A. S., Tatarov, Yu. N., Teleshev, A. P., Uzilevskiy, V. S., and Shpak, G. G., "Development and Industrial Application of Ensembles of Automatic Lines and Special Machine Tools for Machining the Housings of Automobile and Tractor Drive Shafts."

Submitted by the Ministry of the Machine Tool and Tool Building Industry.

52. Didenko, A. M., Yeremenko, B. S., Zmiyevskoy, N. N., Kostin, A. A., Lotorev, A. F., Lushchitskiy, Yu. V., Lysenko, V. N., Petrenko, K. P., Povetkin, G. M., Puchkov, A. I., Simson, A. E., and Tsayzer, G. G., "Development and Organization of the Continuous-Flow Production of High-Power and Economical Tractor and Combine-Harvester Diesel Engines With Efficient Gas Turbine Supercharging Systems."

Submitted by the Ministry of Tractor and Agricultural Machine Building.

53. Agafonov, V. G., Androsov, V. Ya., Bol'shakov, V. F., Vakhrameyev, Yu. Z., Dranitsyn, S. N., Malanyuk, Ye. A., Mitusova, T. N., Raytvskaya, Ye. A., Solodukhin, V. M., Sal'nikov, Ye. S., Samoylov, G. F., and Tsvetkov, O. S., "Development and Introduction of an Ensemble of New Equipment and Technologies Assuring a Reduction in Diesel Fuel Consumption and Conservation of all Fuel and Energy Resources Used in Maritime Transport."

Submitted by the Ministry of the Maritime Fleet.

54. Gagarskiy, E. A., D'yakonov, V. V., Gorbach, V. I., Zimina, A. P., Zotov, D. K., Golubev, G. I. Mazin, A. I., Mazurov, V. I., Natsina, A. V., Orekhov, A. T., Pichin, A. I., and Rostovtsev, V. A., "Formulation of the Scientific Principles of High-Capacity Technological Transport Systems Based on Type-Size Series of Logging Loads and Their Development and Mass Introduction."

Submitted by the Ministry of the Maritime Fleet, the Ministry of Railroads, and the Ministry of the Timber, Pulp and Paper, and Wood Processing Industry, USSR.

55. Azarov, A. D., Bekichev, V. I., Gorfinkel', B. I., Yekimov, Ye. G., Ivashchenko, A. V., Minkin, L. K., Sevost'yanov, V. P., Serov, B. Ya., Sukhariyer, A. S., Titov, V. V., Tsarev, V. P., and Tsvetkov, V. N., "Development and Organization of the Production and Supply of Indicator Devices for the USSR National Economy."

Submitted by the Production Association of the Ministry of the Electronics Industry.

56. Aksenov, V. V., Varyatin, A. G., Denisov, Yu. S., Ziman, Ya. L., Zlobin, L. I., Kel'ner, Yu. G., Knizhnikov, Yu. F., Kozlov, V. V., Myuller, K. K., Ryumin, V. V., and Chesnokov, Yu. M., "Development and Introduction into the National Economy of Techniques and Apparatus of Multizonal Photography for Investigating the Earth's Natural Resources from Outer Space."

Submitted by the Institute of Space Research, USSR Academy of Sciences.

57. Aliyev, R. A. o., Aliyev, T. M., Berezovskiy, V. A., Guseynov, A.-M. D. o., Guseynov, E. A. o., Ibragimov, I. A. o., Ismailov, A. a. o., Krivosheyev, V. P., Ter-Khachaturov, A. A., Ulanov, G. M., and Efendiyev, I. R. o., "Development and

Introduction of Control and Information Systems for Enhancing the Efficiency of Production at the Petroleum Refining Industry of the Azerbaijan SSR."

Submitted by the Azerbaijan SSR Ministry of the Petroleum Refining and Petrochemical Industry.

58. Baranov, A. S., Gritsenko, V. I., Zabolotnyy, V. I., Konovalov, V. N., Korol', R. S., Makhon'kin, Yu. Ye., Moroz, S. S., Papchenko, O. M., Rukhlyadev, Yu. N., Siverskiy, P. M., and Chuyenkov, V. I., "Development and Broad Introduction Into the National Economy of a High-Capacity Automated System for Processing Aviation Equipment Test Findings."

Submitted by the Institute of Cybernetics imeni V. M. Glushkov, Ukrainian SSR Academy of Sciences.

59. Aleksandrov, N. V., Berezin, V. B., Bobylev, O. V. Borzov, V. G., Kuz'min, A. I., Ogon'kov, V. G., Petrashko, A. I., Sushkova, I. T., Kval'kovskiy, A. V., and Shologon, I. M., "Procedures for Developing and Introducing Into the National Economy a Broad Nomenclature of Electrical Insulating Materials Based on Mica Wafers."

Submitted by the All-Union Scientific Research and Design-Technological Institute of Electrical Insulating Materials and Foliated Dielectrics.

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/IT IS REQUESTED THAT ALL RESPONSES, REPORTS ON DISCUSSIONS AND COMMENTS ON THE ABOVE WORKS AND AUCTORIAL TEAMS BE SENT TO THE COMMITTEE'S SECRETARIAT NO LATER THAN BY 15 AUGUST OF THIS YEAR, AT THE FOLLOWING ADDRESS: 125047, MOSCOW A-47, 3-YA TVERSKAYA-YAMSKAYA UL., DOM 46./ [printed in boldface[

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CSO: 1814/148

DEVELOPMENT OF RADIO ELECTRONIC HOME EQUIPMENT SURVEYED

Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 83 p 2

/Survey prepared by the Division of Instrument Making and Radio Electronics of the USSR State Committee for Science and Technology: "Radio Electronics in Homes"/

/Text/ A significant upgrading of the quality and a constant renewal and improvement in the assortment of consumer goods are some of the basic problems solved by industry during the current five-year plan. Following the course of the 26th congress, our party concentrates its attention on this section. Concern for the good of the people resounded with new strength in the recent decree of the CPSU Central Committee and the USSR Council of Ministers "On Additional Measures To Improve the Population's Provision With Consumer Goods in 1983-1985."

Radio electronic equipment makes up more than one-half of the volume of sale of articles for cultural and domestic purposes through the trade network. Technically, this is the most complex type of commodity.

One of the subprograms of the scientific and technical program for the development of technically complex consumer goods is subject to the solution of problems connected with the production of novelties in radio electronic home equipment.

Television Sets

A stable tendency toward an increase in the population's effective demand for color television sets has appeared in the last few years. Black-and-white television sets more frequently begin to perform an auxiliary role and are used as second sets.

The total pool of television sets in operation amounts to approximately 80 million, of which more than 11 million are color sets. They are mainly tube-semiconductor models. Tube sets, especially color ones, have a high power consumption (250 watts) and a big weight (60 kg). Second-generation semiconductor color television sets are also supplied. They have a slightly lower power consumption (185 watts) and weight (48 kg). Simple calculations show that all of them consume approximately 20 billion kWh of electric power annually. A change of generations of television receiving equipment will make it possible to reduce this electric power consumption by more than one-half.

The head ministry--Ministry of Communications Equipment Industry--with the participation of the Ministry of Electronics Industry and other subcontractors takes urgent measures for this. Efficient and reliable new television sets will appear on store counters this year.

The assignments of the subprogram have determined the development and mastering of the series production of three third-generation models of color television sets with screens measuring 25, 32 and 51 cm diagonally during the 11th Five-Year Plan. They are equipped with pulse (transformerless) power units and improved kinescopes with self-convergence of beams. Power consumption and weight have been reduced. A higher screen brightness is provided.

An adjusting batch of the 4UPITsT-51 model developed by the Moscow Scientific Research Television Institute jointly with the Foton Production Association was manufactured in 1982. This is a standardized television set with an electronic button program switch and a screen measuring 51 cm diagonally noted for high illumination engineering features. It weighs 29 kg and its power consumption is 85 watts. The Voronezh Elektrosignal Plant manufactures it serially with the Rekord VTs-311 trade name.

In 1982 the Pozitron Scientific Production Association developed and manufactured an experimental batch of portable television sets of the 1UPTsT-25 model with a screen measuring 25 cm diagonally receiving signals in SECAM and PAL systems. Power consumption is 50 watts. Weight, 7 kg. The trade name is Elektronika Ts-431.

The subprogram also envisages the development and mastering of the production of three fourth-generation color television models (USTsT series) with 51-, 61- and 67-cm screens. Pulse power units and highly efficient kinescopes with self-convergence of beams are used here. Circuit and technological design solutions have been realized by means of a new cell base, integral microcircuits and big hybrid integral microassemblies, which makes it possible to attain an efficient power consumption, small weight, good screen brightness and high reliability and technological properties of manufacture. New functional capabilities and consumer qualities, for example, television games and remote control, will be incorporated in such television sets.

Of the television sets of this series industrial output of the 2USTsT-61 base model developed by the Moscow Scientific Research Television Institute jointly with the Gorizont Production Association began in 1982. The capabilities of incorporation of remote control and electronic program selection have been realized in this standardized set of a cassete-module design with a screen measuring 61 cm diagonally. Electric consumption in the operating mode is no more than 120 watts. Weight, 32 kg.

In 1982 the Minsk Gorizont Production Association manufactured 1,500 of these television sets with the Gorizont Ts-255 trade name. No fewer than 40,000 units are to be manufactured in 1983. In 1985 the output of this model (in addition to what has been indicated, with Tauras Ts-255 and Raduga Ts-225 trade names) will be increased manyfold.

In 1983 the Voronezh Elektrosignal Plant serially masters the promising ZUSTsT-51 base model. Screen brightness will be twice as high as that of the first and second generation and weight, only 25 kg. The model's trade name is Rekord VTs-320.

The development of the ZUSTsT-67 model is being completed in 1983 and its series production will begin in 1984. The standard television set of a cassette-module design with a screen measuring 67 cm diagonally and a beam deflection angle of 110 degrees has an electronic program selection, an electronic clock, remote control, an electronic program memory and other functional capabilities. Electric consumption in the operating mode should total no more than 100 watts and weight, 30 kg. The trade name is Elektron Ts-265D.

Third- and fourth-generation sets will make up 88 percent of the total output of color television sets at the enterprises of the Ministry of Communications Equipment Industry in 1985. By the end of the five-year plan doubler ministries (Ministry of Radio Industry and so forth) should also basically change over to the output of third-and fourth-generation television sets.

To ensure a reliable competitiveness of our television sets, the Ministry of Communications Equipment Industry with the participation of the Ministry of Electronics Industry and the Ministry of Radio Industry on the basis of the series of fourth-generation sets should accelerate the development of television sets capable of receiving signals in other systems (PAL, SECAM and NTSC), as well as having a stereophonic reproduction of sound accompaniment and many other qualities and functional capabilities.

Tape Recorders

The production of tape recorders in the country exceeds 3 million units annually. The assortment of models is expanding. By the end of the 11th Five-Year Plan the annual output of tape recorders will reach 4 million units. At the same time, stereophonic cassette and reel models of the second and third groups of complexity will be predominant.

The technical features of the best domestic models of home tape recorders have now reached a level accessible only to professional equipment not long ago.

The subprogram envisages the development of several base models of cassette tape recorders by the enterprises of the Ministry of Communications Equipment Industry, the Ministry of Electronic Industry and the Ministry of Radio Industry during the 11th Five-Year Plan. The output of Mayak-120, Mayak-231, Rostov-105, Kometa-120, Vil'ma-102, Vesna-207, Elektronika-305 and Proton-401, as well as Mayak-010 and Vil'ma-010, apparatus is now being mastered. New functional capabilities ensuring high consumer properties have been developed in them:

possibility of listening to a program during recording;

quartz stabilization of the shaft rotation frequency;

presence of efficient noise reduction systems;

use of timers and program units automatically connecting and disconnecting an apparatus at a preset time, as well as ensuring the possibility of operation according to a written program;

possibility of using various types of tapes with an automatic adjustment of recording regimes;

use of electronic indicators of tape consumption and of the level of recording reproduction noted for a high information content executed on light guides, liquid crystals or fluorescent devices;

possibility of controlling the recorded signal from the source and magnetic tape.

Nevertheless, the increasing requirements on magnetic recording equipment are not yet fully met. The consumer properties, level of esthetic indicators, level of circuit engineering and design solutions, technological qualities and operating reliability of home tape recorders are slightly lower than the parameters attained by leading foreign firms.

Work on the development of small-size and miniature equipment has now begun. A small material intensiveness and power consumption and low labor expenditures are among its advantages. There is an urgent need to accelerate the studies directed toward the development of domestic tape recorders with digital signal conversion. The Kiev Mayak Scientific Production Association--head enterprise for the development of magnetic recording equipment--will have to solve big problems here.

The shortage of a number of accessories, primarily electric engines, causes considerable difficulties in the development of the output of modern cassette tape recorders. The Ministry of Electrical Equipment Industry should take efficient measures to bring the output of the DP-39 electric engines in accordance with directive volumes and periods. The large series production of DSG-0.6-1500 electric engines must be mastered before the end of the five-year plan and the development of electric engines for small-size microcassette equipment must be completed in 1983.

Radio Receivers and Sets

The development of stationary single-unit combined equipment--radio phonographs, music centers and electrophones--proceeds along the line of reduction of the output of monophonic models (especially electrophones and radio receivers) and stereophonic equipment not meeting high-category standards. The share of portable radio receivers and radio tape recorders with clocks is increasing.

During the next decade the overwhelming part of stationary unitized equipment will be manufactured in the form of two-channel stereophonic models. Modern portable and pocket equipment with autonomous and universal power supply is

developing in two directions. First, the technical characteristics, comfort and complexity of comparatively expensive and large-size sets are increasing. Second, the process of miniaturization of small-size apparatus is intensifying. Between these extreme forms models of average sizes and cost continue to be renewed.

In the basic technical characteristics determining the quality of sound domestic models of radio electronic home equipment are comparable with foreign models, but many are still inferior to them in mass size characteristics, consumed power, external finishing, reliability and in a number of cases in the range of consumer properties and functional capabilities.

As is well known, most innovations are introduced into stationary unitized equipment. It includes higher-category radio sets, whose development and mastering in production are envisaged by the assignments of the subprogram. They are as follows: a radio receiving unit-tuner, an electric record player, a cassette tape drive and acoustic extension systems.

Assignments for first-category radio sets, such as Amfiton-101, Radiotekhnika-101, Vega-118, Romantika-120 and Oda-101, have also been envisaged. All these models will be mastered in series production in 1983-1984. Furthermore, the development of three new base models of portable radio receivers with an ultrashort wave range has been determined.

Some achievements can be noted in the development of this direction in home radio equipment. For example, in a short time the Berdsk Radio Plant has begun the output of a mass model of the third-category Vega-328 radio-tape recorder. However, there are also serious oversights. For example, the Vega-118 radio set, owing to the disclosed need to raise basic parameters, will be put into series production only in 1984.

In 1982 the enterprises of the Ministry of Communications Equipment Industry lagged behind the subprogram in the output of an experimental batch of a new first-category radio and tape recorder and in the series production of the higher-category Feniks-005 radio set. Both assignments were not fulfilled owing to the lack of delivery of accessories by the enterprises of the same ministry.

The Ministry of Communications Equipment Industry--head ministry for the development and output of radio electronic home equipment in the country--must give an example of a prompt and qualitative fulfillment of the assignments of the outlined plans or programs. It is necessary to take efficient measures to ensure the population's demand for high-quality equipment meeting the modern technical level.

11,439
CSO: 1814/147

STANDARDIZATION OF EQUIPMENT ACCESSORIES URGED

Moscow EKONOMICHESKAYA GAZETA in Russian No 23, Jun 83 p 9

/Article by A. Krasnyy, docent at the North-Western Correspondence Polytechnical Institute, candidate of technical sciences, Leningrad: "Standardization Reduces Expenditures"/

/Text/ The continuous improvement in the designs of machines leads to a frequent change of articles manufactured by plants. The path from a prototype to series production is very difficult. The technological preparation of production is its main section. In turn the periods of production preparation are determined mainly by the time of manufacture of equipment accessories--devices and tools.

The rise in the requirements for the precision of machine parts and units and for their quality, reliability and durability necessitates an increase in the number of manufactured accessories. The cost of the technological preparation of production and the expenditure of labor and material resources grow accordingly. There is another inconvenience. Many machine tool devices do not ensure a high productivity, because manual clamps are used in them. It is economically inadvisable to manufacture expensive accessories with a mechanical drive for a short use. Therefore, despite the complication in machine designs the use of modern highly productive accessories grows slowly.

The solution of these problems is connected with the standardization of machine tool devices. The essence of this method lies in the fact that the designer should not design a special device for the machining of every part. Suffice it to take "from the shelf" a ready standardized design and to provide for the rearrangement of individual elements in it, that is, to make a "tie" to a specific machined part.

A standardized base device is manufactured once and change settings for the machining of specific parts are attached to it. A number of Leningrad's plants have already accumulated significant practical experience in the operation of standardized resetable machine tool devices.

The new method yields a substantial saving, which is made up of three basic parts. The first component seems very impressive. This is a saving obtained as a result of the replacement of a big number of special devices with one base device. With respect to some devices the annual saving resulting from the replacement of special accessories alone amounted to 40,000 or 50,000 rubles annually at the Leningrad Russkiy Dizel' Plant.

Work on the standardization of machine tool devices was carried out by the Russkiy Dizel' Plant in close cooperation with the Department of Machine Building Technology of the Leningrad Order of Lenin Polytechnical Institute imeni M. I. Kalinin. A specific method of accomplishing this task has been worked out and right now plant technologists and designers themselves are developing new designs of standardized resetable devices.

The second saving component lies in the fact that base devices are mechanized. This is fully justified economically. After all, one such device replaces dozens and sometimes even hundreds of special devices. Broad prospects for the mechanization of the machine tool operator's labor are opened. The annual saving resulting from mechanization per base device amounts to several thousands of rubles annually.

Finally, the use of base devices shortens the path from the output of a model to a series. The experience of Russkiy Dizel' has shown that, as compared with existing methods of equipping production, the use of standardized resetable equipment accessories shortens the period of technological production preparation to one-sixth or one-eighth.

At a number of Leningrad enterprises and associations in the plans for new equipment much attention is now paid to the development of standardized resetable equipment accessories as the main direction in improvement in technology. Of course, not only the people of Leningrad engage in this. Subdivisions have been established in some sectors. They carry out work on the development of specialized resetable accessories for series production.

There is a scientific basis and technical experience has been accumulated for the new method. However, the success of any endeavor is decided by efficient organization and, in our opinion, the keys to the solution of this problem are found here.

Part of the organizational problems must be solved within enterprises. The introduction of resetable equipment accessories is inseparably connected with production organization, primarily with the establishment of closed sections. The list of the parts machined there must be coordinated with the list of the base devices servicing the same section.

However, for the most rapid introduction of resetable equipment accessories it is necessary to combine and coordinate the efforts of individual enterprises, establishing unified specialized centers in sectors.

In our opinion, the specialized center should consist of a plant manufacturing standardized devices and parts for them, bases for the rental of universal assembly devices, a design office, a consultation center and a technical information office.

The idea of establishment of centers for the production of equipment accessories is not new. Unfortunately, this problem has not been solved to this day. A great deal depends on the initiative of plant workers who must select the best designs of resetable accessories for the transfer of their manufacture to specialized plants.

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BOOK ON POST-WAR SCIENTIFIC, TECHNICAL DEVELOPMENTS IN LENINGRAD REVIEWED

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Jun 83 p 2

[Review by N. Lebedeva, doctor of historical sciences, of book "Deyatel'nost' KPSS po vosstanovleniyu i razvitiyu nauchno-tekhnicheskogo potentsiala Leningrada. 1945--1966" [Activity of the CPSU in Restoring and Developing Leningrad's Scientific and Technical Potential: 1945--1966] by A. A. Smolkina, Izdatel'stvo LGU, 1983]

[Text] Speeding up scientific and technical progress, the broad-based and rapid introduction of the achievements of science, technology, and advanced experience into production, as was noted at the 26th party congress and at the November (1982) and June Plenums of the CPSU CC, rank first among those major reserves which the national economy of the country has at its disposal to solve the problems of increasing the effectiveness of the economy.

The recently published monograph by the Leningrad historian A. A. Smolkina* studies the role of the organizational-party and ideological-political work of the Leningrad organization of the CPSU in restoring and developing Leningrad's scientific and technical potential during the 20-year period immediately following the war, which constitutes the least-studied period from this point of view.

On the basis of numerous examples and facts the book shows how, under the leadership of the Leningrad party organization, along with restoration of the material base of science, new scientific-research institutes were formed, oriented toward developing prospective directions for science and technology; the renovation and retooling of industrial enterprises was carried out; problem, sectorial, and plant laboratories were organized; scientific personnel were trained; problems were solved in the area of creating more-improved machinery, instruments, mechanisms, and in seeking out new types of raw materials and fuel. The efforts of Leningrad's scientists and production specialists were concentrated on solving such important and prospective lines of technical progress as the rapid growth of the country's

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* A. A. Smolkina, "Deyatel'nost' KPSS po vosstanovleniyu i razvitiyu nauchno-tekhnicheskogo potentsiala Leningrada. 1945--1966" [Activity of the CPSU in Restoring and Developing Leningrad's Scientific and Technical Potential: 1945--1966], Izdatel'stvo LGU, 1983.

energy capacities, the use of atomic energy for peaceful purposes, the mechanization and automation of production processes, the creation of semiconductors and synthetic materials, etc.

Particularly great attention was paid to the development of sectorial science. Over the 20-year period the number of scientific-research institutes and planning-designing organizations increased in Leningrad from 88 to 318. More than one-fifth of the scientific institutions created in the country from 1960 through 1965 were accounted for by Leningrad. This was connected with the development of research in a number of new sectors of natural, technical, and social sciences, as well as with the specialization of Leningrad's economy in the direction of developing the scientific-intensive sectors of production.

The monograph studies in a multi-faceted manner the activities of all the units of the Leningrad party organization--the Obkom, Gorkom, the party raykoms and primary party organizations with regard to activating the work of employees in the academic, sectorial, and VUZ scientific facilities, development of initiative in the mass movement of efficiency experts and inventors, as well as strengthening the cooperation between science and the production line. The monograph sums up the experience in re-structuring the party organizations in connection with the association of related scientific-research institutes and VUZ's, the creation of unified party groups made up of Communists from laboratories and workshops engaged in working on a single problem; it also thoroughly analyzes the forms and methods of raising the ideological-political level of the scientific intelligentsia, the establishment of permanent contacts between the party organizations of enterprises and the scientific-research institutions, improvement of the monitoring controls over the execution of joint socialist pledges and agreements by the creative community.

Acting as the initiators for concluding such agreements in 1949 were the industrial workers along with the leaders of science and technology; they pledged to turn Leningrad into one of the most important centers of technical progress. The book convincingly demonstrates that the "alliance of science and workers," about which V. I. Lenin wrote that it was a very great creative force, after becoming an important trait of Leningrad's life during the post-war five-year plans, did not lose its importance even during the following years. By relying on extensive factual material and utilizing archival documents, the author has created an impressive picture of the struggle of Leningrad's party organization for speeding up the pace of scientific and technical progress in the country.

This monograph is of undoubted interest for scientific workers and teachers, as well as for propagandists.

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WORK OF TRANSLATION CENTER DESCRIBED

Moscow MOSKOVSKAYA PRAVDA in Russian 18 Jun 83 p 3

[Article by I. Gukasov: "Center for Translations"]

> [Text] On 19 June the All-Union Center for Translations of Scientific and Technical Literature and Documentation will be 10 years old. This is a scientific-research institute, subordinate to the USSR State Committee for Science and Technology and the USSR Academy of Sciences. Its work is described below by its director, Doctor of Philological Sciences Yu. I. Marchuk.

The necessity for creating our center was dictated both by the expansion of foreign economic, scientific-technical, and information ties, and by the attempt to coordinate scientific research in the field of translation theory, the creation and perfection of a system of machine translation, and all translation activity in the country. The VTsP [All-Union Center for Translations] was also entrusted with the functions of a pilot organ of the International Information Service for Scientific and Technical Translations. In supporting international ties and in exchanging translations and operational experience with the organizations of the CEMA member-countries and those of other states, we are endeavoring to facilitate the development of economic and scientific contacts, as well as to propagandize the Soviet Union's scientific and technical achievements abroad. One of the principal scientific tasks of the Center is participation in the comprehensive program for the creation of a state, automated system of scientific and technical information.

Other scientific activities of the VTsP, no less important and urgent for the directions of the national economy, are improvement of the systems of machine translation from English, German, and French into Russian, systems which have been created at the Center and which are now in experimental-industrial use, as well as providing information by means of scientific and technical translations. In the process of being developed is a new type of information services: we are creating a store of results of machine translation on magnetic tapes. At any moment the user will be able to obtain material on the topic of interest to him.

The automated system entitled "Perevod" [Translation] has been put into experimental-industrial use. It will provide an improvement in the quality and operation of handling the orders coming into the Center, the amount of which is

steadily growing from year to year. And, you know, the fulfillment of these orders constitutes the principal national-economic task of our center.

The VTsP is constantly cooperating with more than 3,000 enterprises, institutions, and organizations throughout the country, along with a number of major foreign firms which enjoy worldwide renown, and this is one of the testimonials to the high quality of the "product" being turned out. Taking into account the time requirements and wishes of our clients, we have created specialized editorial offices for machine building, construction and architecture, computer technology and machine translation. VTsP editorial offices have come into being in Gorkiy, Kiev, and Tbilisi. A branch has been opened in Rostov. The purpose of creating new editorial offices is to get as close as possible to the client, which reduces the time required to carry out translations, facilitates a more effective information service in the localities, along with the fastest possible putting of new equipment into use, and this is extremely important from an economic point of view.

During the 10 years of its existence the Center has transmitted to science and the national economy a considerable amount of translations about the latest achievements of science and technology, thereby also expanding the general state information store, which is being assembled in the USSR GPNTB [State Public Scientific and Technical Library]. The annual volume of translations turned out by the VTsP now exceeds 66,000 authors' sheets, that is, 1.5 million printed pages. Information on them is published in the serial entitled "Index of Translations of Scientific and Technical Literature." As an aid to translators and specialists who know foreign languages, the VTsP issues various methodological, survey, bibliographical, and reference materials, as well as notebooks of new terms which appear regularly in the world scientific and technical literature.

The rapid development of science and technology, the need for the fastest possible introduction of new achievements into practice have confronted us with ever-newer tasks. Accordingly, we are seeking reserves for attaining greater effectiveness, to improve the quality of our "product"--translations of scientific-technical literature and documents.

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RESEARCH AT INTERNATIONAL SCIENCE CENTER AT MINSK DESCRIBED

Moscow PRAVDA in Russian 16 May 83 p 4

[Article by L. Chausov, PRAVDA special correspondent: "Thought at Work: A Report from the International Science Center"]

[Text] Outside the walls of the institute the spring sun is triumphant, but not the tiniest ray penetrates through the large windows of the laboratory. They are tightly shuttered with black screens, and in the darkness you can easily make out the tiny bulbs of the indicators on the signal panel of the electronic apparatus. Suddenly all the objects and the people in their white lab-coats are illuminated by the bright-raspberry-colored luminescence of a laser beam. The needle of light penetrates the space within the apparatus, "signaling" the beginning of a routine experiment....

It is with this laboratory, where human beings are aided by computers and lasers, that we have begun our acquaintance with the unusual "business" of this international center of the academies of sciences of the socialist countries, created in order to upgrade the qualifications of scientific personnel working on the problem of "Heat and Mass Exchange."

The Center has already been operating for ten years at the base of the Institute for Heat and Mass Exchange imeni A. V. Lykov of the BSSR Academy of Sciences, and it has merited high authority among the scientific circles of the socialist community.

"The extensive international ties of the Center are carried out in various forms--ranging from the exchange of information on specific problems of research to developed interactions, bilateral as well as multilateral," I have been told by the institute's director, a winner of the Lenin Prize and corresponding member of the USSR Academy of Sciences, R. Soloukhin. "We are conducting joint projects on prospective plans with the academic and sectorial organizations of Bulgaria, Hungary, the GDR, Mongolia, Poland, Czechoslovakia, and also Yugoslavia."

Recently scientists from Vietnam and Cuba stated their intention to become participants in this center. Their aspiration to join this international group of researchers is fully understandable. Reciprocally supplementary scientific research on agreed-upon programs and topics, joint utilization of a common experimental base by all the cooperating organizations, the exchange of experience,

junior-level persons, and publications, field trips to international and national scientific conferences--all this allows a substantial reduction in the time periods required to conduct scientific studies, savings on funds, and the attainment of more substantial practical results.

The institute and its center are engaged in the study of a broad range of problems --from the drying and heat processing of grain and food products to the theory of the heat protection of spaceships. The science of heat-and-mass-exchange serves as the theoretical basis for the applied utilization in the national economy of the achievements of molecular physics, physical kinetics, and other scientific disciplines. It plays a significant role in the creation of electric-power engineering projects, including nuclear ones, as well as in planning highly intensive apparatuses and machines for diverse engineering processes in industrial sectors.

During the past year alone the institute's specialists accepted about 100 persons sent to them by the fraternal countries. Considering this to be one of the particularly successful examples of mutual cooperation with colleagues from the CSSR, the director cites data on the direct bilateral contacts with the State Research Institute for Machine Building in Prague. Cooperation in scientific thought with their Czechoslovak partners allowed them to create original designs of heating pipes, to develop and experimentally verify an extremely effective engineering method for designing heat-exchange apparatuses. Also proposed for use in industry was a method for granulating and drying heat-sensitive materials, in particular, washing powder. Several patents were obtained on joint inventions.

Accompanied by the institute's scientific secretary, V. Dragun, I went around to the various auditoriums, where international school-seminars are held twice a year.

"Each of the participants," my companion explained to me, "comes to Minsk in order to deepen his own knowledge in this or that previously chosen topic. As experience has shown, they all return to their homelands with their baggage full of new ideas and creative thoughts."

"Rethinking this experiment, which was shared in by my Soviet colleagues, allowed me to acquire new knowledge regarding the theory of processes of unequal weight in gasses," I was told in confirmation of this by Juan Garrido, a graduate student from the Republic of Cuba. "Now I intend to reflect the information thus acquired in my dissertation."

His colleague, Santiago Perez Guerra, does not hide his joy: together with the Minsk people, he succeeded in creating a model of a whirlwind process which closely resembles the "behavior" of waterspouts and hurricanes which hurl themselves at countries with a seacoast. This will enable people to combat such natural disasters more confidently....

The Minsk people have an entire arsenal of various forms of training foreign scientific personnel. One of them consists of prolonged academic semesters of individual specialists from the fraternal countries, as explained to me by the director

of the International center group, I. Khodan. What is this? The junior scientists from abroad come to Belorussia in order to conduct their own research studies at the institute, utilizing the basic experience of their Soviet colleagues, as well as their rich scientific and technical base.

Convincing proof that this is justified was provided to me in meeting with the Polish junior scientists of the center (you can see them in the photo during the experiment with a laser-doppler velocity-measuring device). Edmund Wach came from Gdansk, and Zbigniew Bis came from Czestochowa. They are both in the Soviet Union for the first time.

"To be sure, we did not suppose that there would be such a cordial, albeit businesslike reception," said Edmund smilingly. "On the other hand, we knew beforehand that our Soviet friends always have something to teach and something to learn. I think that there should be more such contacts between the scientists of our countries: you know, the Minsk International Center offers wide possibilities for joint work, but we need to make better use of them."

During the years of the Center's activity hundreds of scientists from the socialist countries have received training there. And the ensuing results of their work indeed confirm the usefulness of joint scientific research studies.

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DYUMAYEV DISCUSSES DEVELOPMENTS IN SOVIET CHEMICAL INDUSTRY

Riga SOVETSKAYA LATVIYA in Russian 1 Apr 83 p 2

/Interview with Doctor of Chemical Sciences Kirill Dyumayev, deputy chairman of the USSR State Committee for Science and Technology, by Aleksandr Petrukhin; date and place not specified/

> /Text/ In its total volume of production, the USSR's chemical industry ranks first in Europe and second in the world. A large role in this sector's development belongs to the scientists. What problems they are solving in the current five-year plan are discussed by the deputy chairman of the USSR State Committee for Science and Technology, Doctor of Chemical Sciences Kirill Dyumayev in an interview with APN correspondent Aleksandr Petrukhin.

/Question/ During the present five-year plan about 20 targeted and other scientific and technical programs must be carried out. Two years have passed since the beginning of the five-year plan. What have Soviet chemists succeeded in accomplishing during this period of time?

/Answer/ Quite a bit has been accomplished. Let me dwell on merely a few of the most important projects. Thus, Soviet scientists have obtained new polymer materials which, with respect to a number of properties, surpass metals. What we are talking about, in particular, is the important work being conducted at the Institute of Chemical Physics of the USSR Academy of Sciences. Created here have been materials with good prospects--the norplasts. This is a successful combination of polymers with organic filler-aggregates (tufa /porous rock/, slag, sand, etc.), which allows considerable savings to be made on the base product--petroleum. Moreover, there is also a sharp reduction in the expenditure of polymers; they merely bind together the non-organic substances, the reserves of which are in great abundance on Earth.

The sphere of utilization for norplasts is most diverse. They are suitable for the manufacture of pipes, all manner of parts in machine building, and in construction.

The method of polymerized filling of thermoplasts makes it possible for us to obtain materials containing as much as 30--50 percent of mineral filler-aggregate and enables us, in manufacturing items made of them, to use the traditional methods of

processing. In order to produce heat-insulating and finishing materials, compositions have been created which contain modest amounts of polymer and 85--90 percent of mineral filler-aggregate.

During the current five-year plan it is intended to create synthetic complex mono-threads and film threads which in their strength will surpass the existing ones by a factor of 1.5--2, and with respect to the modulus (of rigidity)--by a factor of 2--3, and to master their production. In the future they will be called upon to crowd out the natural fibers being used in engineering.

The first steps have been taken for carrying out this targeted program. The chemical-fiber plants have organized the production of high-strength film threads, which has allowed us to abandon the manufacture of viscous binder twine. The valuable raw material thus freed up is being directed into the production of viscous fiber, from which consumer goods are being obtained.

Catalysts are substances which alter the speed of a chemical reaction. With their use approximately 75 percent of the output of the chemical, petroleum-refining, and petrochemical sectors, as well as the mineral-fertilizer industry, is now being produced. Bio-organic catalysts are being created which possess a high degree of selectivity and activity. With their aid we can obtain products of a high degree of purity. The All-Union Scientific-Research Institute for Petroleum Refining has developed the technology for obtaining a new aluminum-silicate, zeolite-containing catalyst for cracking. In 1982 the industry mastered its production.

/Question/ What contribution are chemists making to the fulfillment of the Food Program?

/Answer/ Our scientists have proposed, for example, the manufacture of a protein-vitamin concentrate (BVK) for livestock, based on a product of the petroleum-refining enterprises--the purified liquid paraffins of petroleum. The plants for producing this concentrate are already in operation. According to the calculations of the specialists, a ton of BVK contains just as much protein as is contained in approximately 4.5--5 tons of grain. The effect is impressive. The addition of one ton of concentrate to the feed makes it possible to obtain an additional amount of livestock-raising output.

But the scientists have not rested on their laurels. They have begun their research again. As a result, a synthesis of BVK has been proposed, based on a widespread raw material--methanol, ethanol, as well as natural gas.

An important role in livestock raising is played by a preparation such as lysine. Its output during the present five-year plan will more than double. At present the technology is being worked out for producing a number of other amino acids. By the end of the five-year plan the production output of the micro-biological industry will almost double, and its assortment will be expanded.

The entire increase in the output of mineral fertilizers during the years 1981--1985 is planned to be provided by means of various complex, highly concentrated

fertilizers, which will be made only in granulated form. In carrying out the targeted program, the scientists created a new type of slow-acting nitrogen fertilizers, the effectiveness of which has been checked out under the conditions of Central Asia. It has allowed us to increase the coefficient of utilization of nitrogen in local soils in an amount double that of the widely used ammonium nitrate. As tests have shown, the crop yield of cotton in connection with this increases by three or four quintals per hectare.

The Vakhshskiy Nitrogen Fertilizer Plant has put into operation an experimental-industrial unit for obtaining carbamide-formaldehyde fertilizer. In 1985 industrial production of this product will begin.

A great deal is being done to carry out the targeted, comprehensive program for developing chemical means of protecting plants from pests and diseases. Production has been mastered on a number of herbicide preparations: trialate, lenazil, and kotoran.

[Question] What problems are now at the center of attention of our chemists?

[Answer] In particular, work is being carried out on obtaining synthetic liquid fuel, new catalysts and composition materials, modifications of stereo-regulated types of rubber with increased cohesion strength, on creating comprehensive systems for protecting pipelines, etc. The scientists are attempting to render assistance in the rapid introduction of new equipment and technology into production.

[Question] Would you tell us, please, how contacts are developing between Soviet chemists and their foreign colleagues?

[Answer] First of all, regarding the cooperation with the CEMA member-countries. We are cooperating most actively, perhaps, with the specialists of the GDR. In conjunction with them we are creating new processes and equipment for producing chemical fibers, plastics, and photo-chemical materials.

Contacts are being successfully developed with Hungary in the field of pharmaceutical chemistry, with Czechoslovakia--in machine building for the chemical industry, and together with Bulgarian specialists we have mastered the industrial output of a luminescence-forming agent.

Fruitful ties have been established with the Western countries--the FRG, France, Switzerland, and others. Joint development is being carried out on specific chemical problems, the exchange of samples of new materials and models of new equipment, as well as information about the latest achievements. In particular, Soviet and Italian specialists have jointly created polycarbonates.

(APN)

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LENINGRAD SCIENTIFIC CENTER'S ACTIVITIES DESCRIBED

Moscow PRAVDA in Russian 12 May 83 p 3

[Article by PRAVDA correspondent V. Gerasimov: "Unity in Search. The Leningrad Scientific Center of the USSR Academy of Sciences in Action"]

[Text] The role of Leningrad scientists and specialists in developing scientific and technical progress is well-known and significant. In their research and discoveries there are sources of entire directions for the modern industry, and the close and constantly strengthening union of science with practice promotes systematic reduction of periods in creating progressive manufacturing methods, machines, devices and materials and in raising the quality of goods produced by enterprises. Basic work is being conducted on a large scale. The Leningrad Scientific Center of the USSR Academy of Sciences was created so that the powerful scientific potential of the city and the oblast could be used more fully, that efforts of highly skilled personnel could be concentrated in solving the most important problems and that the material base of scientific search could be strengthend and thereby promote active and rapid introduction in practice of recommendations and developments of the scientists.

"Our scientific center unites academic institutions and organizations that are located in Leningrad and the oblast," said Academician I. Glebov, chairman of the center's presidium and Hero of Socialist Labor. There are 53 such subdivisions. Great strength is concentrated in them: 14 academicians and 32 corresponding members of the academy are working in them. The research being conducted in the institutes covers a great range of problems of paramount importance--from creating new plymeric compounds, research in the field of evolutionary biology, controlled thermonuclear fusion and to fulfilling tasks connected with fulfillment of the Food Program.

Justice must be done to collectives of academic institutions--their work often materializes in specific developments, its fruits are visible. At the same time, persistent raising of its efficiency lies ahead. Here the interaction of collectives plays an important role. Their interests link up quite closely, many crossroads are formed where they meet. Achieving the final result depends to a considerable degree on coordinated activities, on the interest of collectives in fulfilling assigned developments with maximum return and in established periods. In other words, the question is about precise and efficient coordination of efforts of academic institutions, more reliable control over fulfillment

of thematic plans and rendering necessary assistance to collectives. The scientific center has taken on this concern upon itself. In addition to the already established contacts, relations will be maintained through it with sectorial institutes and the higher school. Scientific and methodical supervision of academic instituions will be retained by corresponding departments of the USSR Academy of Sciences.

With the organization of the center there have appeared additional possibilities for better distribution of the resources allocated for developing the material and technical base of institutes and for rational use on a cooperative basis of computer facilities and special purpose laboratory equipment.

There is also another important circumstance. It so happened that for dozens of years the institutes were developing their laboratory base themselves as much as they could. As a result, there appeared certain disproportions. Some institutions are equipped better, others do not have anything to boast about. Can the situation be corrected? The ones that I had an opportunity to talk to believe it is quite possible, even if not right away. But to do this the scientific center should be given the right to manage a definite part of the financial resources.

"I can't make recommendations on how this is to be organized in practice," said M. Koton, director of the High Molecular Compounds Institute and corresponding member of the USSR Academy of Sciences. "But I believe that there is no harm in directing a part of the funds allocated by the academy's departments for their institutes to a special fund of the scientific center and giving it the right to decide which institution is in need of assistance today. This is essential for the dynamic development of the laboratory and experimental base."

I believe that this is a reasonable comment, particularly if one takes into account that in time the academic institutions will be moved into one area from various parts of the city. There are plans to construct an academic center in Leningrad. The scientific center intends to appraise capital construction plans of institutes, to follow the progress of planning and construction of projects and to ensure businesslike cooperation with local organs in solving this and other important problems.

It is known that expenditures for science are impressive. And the task of effectively using the monetary funds, the arsenal of expensive equipment is far from the least in significance. Specifically, already at the first stage the center has real prerequisites for improving patent and licensing work. After all, for the time being not all institutes have subdivisions and competent specialists of this profile and reference material funds. Hence--undesirable outlays. A unified service can avoid them. The principles of intradepartmental control over financial and economic activity and expenditure of all kinds of resources will change. There will be no need for auditors to make trips from Moscow, the control functions will be turned over to the center's accounting personnel.

How to organize most rationally the operation of special purpose equipment that the institutes are outfitted with--devices, electronic machines, charged particle accelerators and installations for fine chemical synthesis? The common

task is clear: such equipment must operate at full capacity and be accessible when necessary to all collectives. The details of interrelations between them must still be sorted out by weighing everyting that is "for" and "against." For the beginning it was decided to create for all academic institutes a unified information and computer center that is linked to them, where each institute will be given enough machine time for research and experiments.

The Leningrad experience testifies: strengthening of the union with production raises the return to science, which is advantageous to it. Seeing in reality the results of their labor, the scientists are conducting explorative research even more actively.

The scientific center is an academic one. But considerable potential is also at the disposal of Leningrad sectorial and educational institutes. The counsel by academicians, corresponding members and leading specialists who work there will also be very useful, I. Glebov believes, although temporarily there is no provision for directed participation by these scientists in the center's work. But are they ready for this themselves?

"I think that they are not only ready but are also interested," believes, for example, V. Glukhikh, director of the Electrophysical Apparatus Scientific Research Institute imeni D. V. Yefremov and corresponding member of the USSR Academy of Sciences. "Moreover, they are ready to participate most actively. Our collective has been cooperating with academic institutions for a long time. The benefit from this is mutual, and the end result, of course with the assistance of production workers, is expressed in reduced periods and expanded scale in implementing many developments that are important for the national economy, particularly of accelerator equipment."

The contacts between the High Molecular Compounds Institute and the Plastpolimer Scientific Production Association are of long standing and strong. The conclusions by specialists of the academic institution are often implemented precisely here in designs and applied developments, are developed without delays in shops and after polishing of manufacturing methods become the property of the sector.

"Our relations with the institute are to a great extent supported by enthusiasm, interest in increasing the national economic effect," notes B. Sazhin, general director of the Plastpolimer Association and doctor of physical mathematical sciences. "I believe that the obstacles that we sometimes come across in implementing recommendations of basic science would be overcome much easier and faster if forms will also be found for leading production workers to participate in the work of the new scientific center. We are placing great hopes in it."

The organization of the scientific center is a great event. There is no doubt that in time there will be a replenishment of the arsenal of forms and methods of work in raising efficiency and deepening basic research and in strengthening the links of academic institutions with production, the higher school and sectorial institutes. The joining of efforts will help in solving important problems of an applied character more rationally and with less expenditures and greater return and in concentrating even better on the problem of organizing a perspective search.

DEVELOPMENT OF SCIENTIFIC INFORMATION SYSTEMS REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 20, May 83 p 2

[Review by the Scientific and Technical Information and Propaganda Administration of the USSR State Committee for Science and Technology in the column "Scientific and Technical Programs": "The Scientific Information System"; passages rendered in all capital letters printed in boldface in source]

[Text] The acceleration of scientific and technical progress dictates the necessity of improving the structure of the information service as well as its material base by introducing contemporary means of automation.

The decisions of the 26th party congress have determined improvement of the scientific and technical information system and patent and licensing work. The realization of the scientific and technical program "To Create a State Automated Scientific and Technical Information System (GASNTI)" was begun in the 11th Five-Year Plan. According to it, the following will be developed and introduced:

line-operated methods of information service to consumers with primary source copies based on the PD-200 data transmission network and the AT-50 telegraph exchange;

distributed automated data bank of scientific and technical information;

sectorial problem-oriented automated information centers;

republic automated scientific and technical information systems; and

international specialized and sectorial information systems of CEMA-member countries.

Line-Operated Information Technology

During the current five-year plan, it is planned to complete the first stage in creating the state automated scientific and technical information system--to put into operation a network of automated information centers that include all-union information institutes and information centers of such leading sectors as power engineering, chemistry, instrument building, electrical

engineering, construction and agriculture and six union republics, including the RSFSR, the Ukraine, Belorussia, Kazakhstan, Azerbaijan and Armenia. Moreover, scientific and technical information organs, which participate in solving this problem, will be equipped with electronic computers [EVM] of a unified series and modern transmitting equipment.

Information compatibility of the automated systems is ensured on the base of a unified magnetic tape service and dissemination of primary sources to microcarriers. Special attention is devoted to telephone (for searching bases for data) and telegraph (for primary source requests) networks.

DURING THE 1981-82 PERIOD, PLANNING AND TECHNICAL EQUIPPING OF SUCH INFORMATION CENTERS WAS COMPLETED IN THE MAIN. MANY OF THEM WHILE IN AN EXPERIMENTAL WORKING CONDITION CHANGED TO FORMING SUBSCRIBER SYSTEMS OF REMOTE ACCESS BY USERS TO DATA BANKS. IN THE LATTER PART OF 1982, THE INTERDEPARTMENTAL COMMISSION ACCEPTED FOR EXPERIMENTAL EXPLOITATION A SUBSCRIBER SERVICE SYSTEM OF THE ALL-UNION SCIENTIFIC AND TECHNICAL INFORMATION CENTER (VNTI TSENTR). IT ALREADY PROVIDES SERVICES TO SUBSCRIBERS OF LENINGRAD, KIEV, MINSK, TALLINN, YEREVAN, ALMA-ATA AND IRKUTSK. THE REMAINING CAPITALS OF UNION REPUBLICS AND MAJOR OBLAST CENTERS WILL BE CONNECTED TO IT THIS YEAR.

It will practically be possible in any part of the country to find and receive within 10 days copies of reports on scientific research and experimental design work (NIOKR) or theses, a complete fund of which is kept at the All-Union Scientific and Technical Information Center.

The information and computing network on social sciences is introduced under the supervision of the Information on Social Sciences Institute (INION). Together with the academy of sciences centers of the Belorussian, Latvian and and Estonian SSRs interesting work was conducted here in organizing remote access to data bases on economics, philosophy, scientific communism, sociology and demography. Moreover, the question is not about experiments but about real satisfaction of demands by specific consumers. What is more, the Information and Social Sciences Institute together with the Technical Cybernetics Institute of the Belorussian SSR Academy of Sciences have tested telephone communication channel transmission of facsimile images--full texts of articles or other documents, which opens new possibilities for supplying copies of them to subscribers who are located thousands of kilometers aways.

WORKING ALREADY NEARLY 2 YEARS WITH THE INFORMATION ON SOCIAL SCIENCES INSTITUTE VIA SWITCHING COMMUNICATION LINES ARE THE UNITED STATES AND CANADA INSTITUTE OF THE USSR ACADEMY OF SCIENCES, ACADEMIC INSTITUTES OF SOCIOLOGICAL RESEARCH, WORLD ECONOMY AND INTERNATIONAL RELATIONS, THE HISTORY FACULTY OF MOSCOW STATE UNIVERSITY IMENI M. V. LOMONOSOV [MGU], THE MOSCOW PHYSICAL TECHNICAL INSTITUTE, THE ALL-UNION SYSTEMS RESEARCH SCIENTIFIC RESEARCH INSTITUTE AND THE INTERNATIONAL MANAGEMENT PROBLEMS SCIENTIFIC RESEARCH INSTITUTE.

IN 1983, 12 MORE INSTITUTES OF THE USSR ACADEMY OF SCIENCES WILL BE CONNECTED TO DATA BASES OF THE INFORMATION ON SOCIAL SCIENCES INSTITUTE. THE SCIENTIFIC INFORMATION CENTER OF THE BULGARIAN ACADEMY OF SCIENCES WORKS REGULARLY, 3 TO 4 HOURS THREE TIMES A WEEK, WITH DATA BASES OF THE INFORMATION ON SOCIAL SCIENCES INSTITUTE VIA AN INTERNATIONAL COMMUNICATIONS CHANNEL.

Principally important results in developing and introducing line-operated access methods to data bases on natural sciences and technology from subscribers' local and remote terminals were achieved at the All-Union Scientific and Technical Information Institute (VINITI). Besides creating a subscribers' remote access network, which now includes 11 leading institutes and scientific centers of the USSR Academy of Sciences, the All-Union Scientific and Technical Information Institute has solved some system-wide questions of constructing a network of the country's automated centers and creating a distributed data and documents bank on scientific and technical information. On this basis the state information system will use possibilities of the collective use information and computing network, which is being created in academies of sciences of the USSR and union republics.

A centralized automated data bank on natural sciences and technology, construction, agriculture and medicine is being formed at present. Already in 1983, it will begin serving not only Soviet but foreign clients as well, mainly CEMA-member countries.

THIS WAS MADE POSSIBLE AS A RESULT OF ORGANIZATION IN 1982 ON THE BASE OF THE ALL-UNION APPLIED AUTOMATED SYSTEMS SCIENTIFIC RESEARCH INSTITUTE OF THE STATE COMMITTEE FOR SCIENCE AND TECHNOLOGY [GKNT] AND THE USSR ACADEMY OF SCIENCES OF A NATIONAL CENTER FOR AUTOMATED EXCHANGE OF INFORMATION WITH FOREIGN NETWORKS AND DATA BANKS. SERVICES OF THIS CENTER ARE USED BY MANY SPECIALISTS BY WORKING COMMUNICATIONS CHANNELS WITH WELL-KNOWN INTERNATIONAL DATA BANKS: PATENT INFORMATION (INPADOK), ON PHYSICS, POWER ENGINEERING AND ELECTRONICS (INSPEK), NUCLEAR SCIENCE AND TECHNOLOGY (INIS) AND OTHERS.

Currently leading information organs of the country have actively begun industrial development of dialogue access methods to automated data bases.

Data and Documents Base

Creation of data bases on various types of scientific and technical information is not only the most important condition for introducing the line-operated technology of information service but also a determining stage in the transition of information organs to resource and material conserving and highly efficient automated work methods. As indicated by the experience in exchanging information on magnetic tapes, which was accumulated during the 1981-82 period, such a method ensures a considerable saving of expenditures in entering information into automated systems. Real prerequisites appear for the formation of a distributed automated data bank on various kinds and subjects of published and unpublished documents with consideration of the information requirements of sectors and regions.

State standards for the structure and content of communicative format were confirmed. The preparation and distribution of materials on magnetic tapes is being implemented by 36 all-union, sectorial and republic information organs.

THE BASIC GENERATORS OF DATA BASES ARE THE ALL-UNION SCIENTIFIC AND TECHNICAL INFORMATION INSTITUTE (FOR PUBLISHED FOREIGN AND DOMESTIC LITERATURE), THE POISK SCIENTIFIC PRODUCTION ASSOCIATION [NPO] (PATENT INFORMATION) AND THE ALL-UNION SCIENTIFIC AND TECHNICAL INFORMATION CENTER (REPORTS ON SCIENTIFIC

RESEARCH AND EXPERIMENTAL DESIGN WORK [NIOKR] AND THESES) AS WELL AS THE VOLGOGRAD INTERSECTORIAL TERRITORIAL SCIENTIFIC AND TECHNICAL INFORMATION AND PROPAGANDA CENTER (MATERIALS ON LEADING PRODUCTION EXPERIENCE). IN 1983, THE OVERALL VOLUME OF DATA RELEASED ON MAGNETIC TAPES WILL REACH DESCRIPTION OF 3 MILLION DOCUMENTS. BY THE END OF THE 11TH FIVE-YEAR PLAN, IT IS PLANNED TO FORM DATA BASES FOR THE ENTIRE ANNUAL FLOW OF DOCUMENTS BEING PROCESSED BY THE COUNTRY'S INFORMATION SERVICE.

The preparation and broad distribution of data bases, which contain information on various types of published and unpublished documents, do not remove but make more acute the question of prompt release to consumers of documents that are of interest to them. The creation of a system for storing and copying scientific and technical information materials on microcarriers--microfilm and microfiche--has become very important.

The services for storing and disseminating microfilmed information on reports on scientific research and experimental design work (on the base of the All-Union Scientific and Technical Information Center), patent documents (the Poisk Scientific Production Association) and normative and technical materials (the Information, Classification and Coding Scientific Research Institute [VNIIKI] of the State Committee for Standards [Gosstandard] are functioning successfully. The territorial (oblast) and republic information centers with microfilm storage facilities are continuing to develop.

Sectorial and Republic Systems

An analysis and inspections of functioning of automated information systems during the 1981-82 period indicated good operation of the automated systems for processing scientific and technical information [ASNTI] on social sciences (the USSR Academy of Sciences) and on patent information (the State Committee for Inventions and Discoveries [Goskomizobretentiy]) as well as the sectorial systems of the Ministry of the Petroleum Industry [Minnefteprom], the USSR Ministry of Power and Electrification [Minenergo], the USSR Ministry of Health [Minzdrav] and the USSR Ministry for Procurement [Minzag] and the republic automated systems for processing scientific and technical information in Belorussia and Estonia.

The use of scientific and technical information in research or design processes, as a rule, does not find direct material expression in absolute figures. At the same time, there are numerous examples of effectives influence by scientific and technical information [NTI] on the progress of work. Thus, some enterprises of the oil refining and petrochemical industries, which spent R4.2 million on maintaining information services during 1 year, have received a total annual economic effect from introducing innovations adopted from scientific and technical information materials in the amount of R60 million. According to data of the USSR Central Statistical Administration [TsSU], enterprises which have staff information workers have been introducing 540,000 technical innovations a year based on scientific and technical information.

Automation of the scientific and technical information service opens additional broad possibilities for obtaining valuable information. It must be noted that

in our country considerably less payment is collected for access to scientific and technical information than in the West. The price lists strictly differentiate prices for information services depending on their complexity and significance. The creation of a state atuomated scientific and technical information system puts on the agenda a consistent conversion of information centers to cost accounting.

A CAUSE FOR ALARM IN THIS CONNECTION IS THE FACT THAT BRINGING UP AUTOMATED SYSTEMS FOR PROCESSING SCIENTIFIC AND TECHNICAL INFORMATION TO THE PLANNED LIMITS HAS NOT BEEN ENSURED AT THE USSR MINISTRY OF THE CHEMICAL INDUSTRY [MINKHIMPROM] AND THE MINISTRY OF THE FISH INDUSTRY [MINRYBPROM] AND THE MAIN ADMINISTRATION OF THE MICROBIOLOGICAL INDUSTRY [GLAVMIKROBIOPROM]. AT THE USSR MINISTRY OF LIGHT INDUSTRY [MINLEGPROM] (DEPUTY MINISTER A. YEFIMOV), THE AUTOMATED SYSTEM FOR PROCESSING SCIENTIFIC AND TECHNICAL INFORMATION IS IMPLEMENTED ON THE BASE OF OBSOLETE TECHNICAL SOLUTIONS. THE SYSTEM THAT WAS INTRODUCED HERE ALREADY DOES NOT MEET CONTEMPORARY REQUIREMENTS.

MORE ACTIVITY MUST BE MANIFESTED BY SCIENTIFIC RESEARCH ORGANIZATIONS AND, ABOVE ALL, BY THE ALL-UNION SCIENTIFIC AND TECHNICAL INFORMATION INSTITUTE--THE LEADING INSTITUTE AS REGARDS THE PROBLEM OF DEVELOPING A STATE AUTOMATED SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM. DESERVED UNFAVORABLE CRITICISM BY CONSUMERS IS EVOKED BY LONG PERIODS INVOLVED IN FULFILLING ORDERS AT THE ALL-UNION TRANSLATIONS CENTER.

Considerable reserves for raising work quality of sectorial and republic scientific and technical information systems are contained in developing their interaction and cooperation in collecting, processing and disseminating information. In the program this direction is reflected in the tasks linked to the creation of thematic and regional associations of the automated system for processing scientific and technical information.

An association of an automated system for processing scientific and technical information makes it possible without additional manpower and capital expenditures not only to sharply increase the volume and expand the subjects and types of processed information but also to expand the scale of information service at the expense of subscribers of thematically connected sectors (for example, 10 construction ministries) and neighboring regions.

International Relations

A characteristic feature of the work in creating a state automated scientific and technical information system during the current 5-year plan is planning and introducing of international specialized and sectorial scientific and technical information systems of CEMA-member countries on machine building, nonferrous metallurgy, chemistry, construction, electrical engineering and energetics, agriculture, food industry and other most important directions. It is planned to improve the already operational international specialized systems on scientific research work, on patent information and industrial catalogues as well as the international automated system for registration of serial publications of CEMA-member countries.

Successes in creating a scientific and technical information system of CEMA-member countries are very much determined by the activity of the International Scientific

and Technical Information Center, which was created in Moscow in 1969. It plays a great role not only in organizing exchange but also in developing and broadly using contemporary technology and methods in processing and disseminating information.

Thus, in March this year together with the Institute of Documents and Scientific and Technical Information of the Republic of Cuba's Academy of Sciences an access contact was conducted to the data base of the International Center on the Moscow-Havana route by using a communications satellite. This experiment is one of the most important stages in creating an automated network for the exchange of information of the international scientific and technical information system.

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SOVIET-WEST GERMAN COOPERATION IN AGRICULTURAL MACHINE BUILDING

Minsk SEL'SKAYA ZHIZN' in Russian 30 Jun 83 p 3

[Interview with Hans Rau by NOVOSTI PRESS AGENCY special correspondent V. Markov: "For Peace and Cooperation"; date and place not specified]

> [Text] West German industrialist Hans Rau, the owner and head of a firm which produces agricultural machinery and equipment, heads an association of agricultural machine and tractor building of the FRG, as well as is the president of a European association of agricultural machine building. At the request of the newspaper SEL'SKAYA ZHIZN' NOVOSTI PRESS AGENCY special correspondent V. Markov met with Hans Rau and asked him to tell about the cooperation with Soviet organizations.

[Answer] "The contacts of our firm with the Soviet Union were established in the late 1970's," H. Rau, who was visiting our country for the first time, relates. "And we were immediately convinced of what great importance is being attached in the Soviet Union to the development of agriculture and international cooperation in this area. In the past 4 years experiments with the use of machines of our firm have been conducted in various regions of the USSR. We are now already satisfied with the obtained results."

[Question] "What do they consist in?"

[Answer] "First of all modern agricultural equipment is called upon to help use sparingly the energy which is consumed for agricultural production. At the same time it is necessary to strive for the reduction of the product cost and, of course, for the increase and stabilization of the yield of agricultural crops. The efficient use of means of mechanization makes it possible to determine the optimum periods for the planting and harvesting of the crop and decreases the losses during harvest time and in the transportation and storage of agricultural products."

[Question] "What do you think about the broadening of Soviet-West German cooperation in the area of agriculture?"

[Answer] "Personally I have absolutely no doubt that very favorable conditions exist for the stepping up of such cooperation. Especially the medium-sized and small firms of the Federal Republic have abundant experience which can also be used to

mutual benefit in the Soviet Union. The number of such firms, which are maintaining business contacts with Soviet organizations, may increase significantly."

[Question] "What, in you opinion, is the political significance of economic relations?"

[Answer] "The maintenance of normal neighborly relations between the Federal Republic and the Soviet Union meets the vitally important interests of both countries. Our common task is to constantly demonstrate everything that unites our people. And this is first of all the aspiration to live in peace, to protect our common European home. And the closer the trade and economic relations between the FRG and the USSR are, the better we will understand each other and the stronger our mutual trust will become."

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